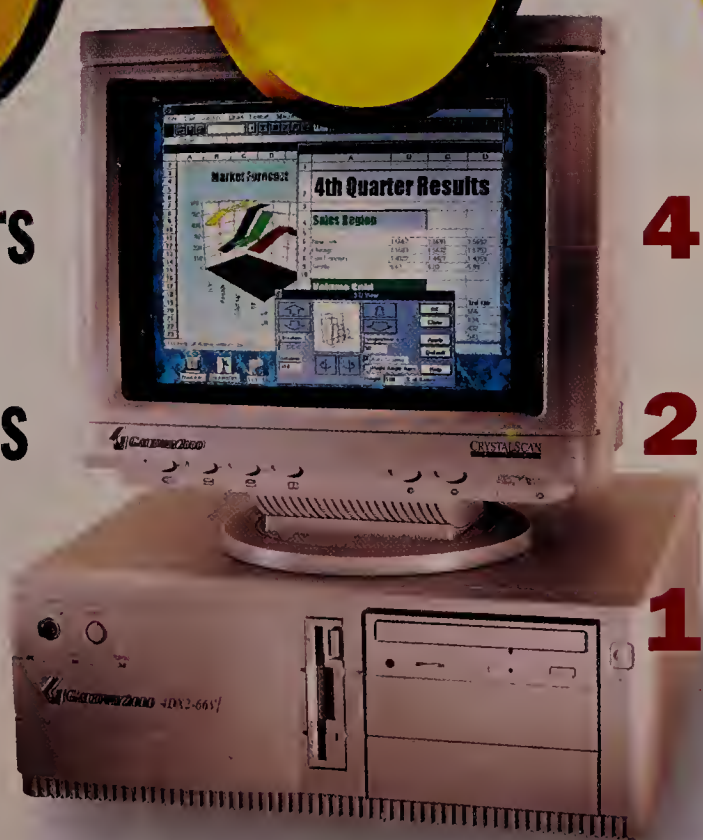
FIRST LOOKS: EXCEL 5.0, MS-DOS 6.2, COMPAQ XE PCS

WIN A 486-66
RATE YOUR PC MAKER'S
SERVICE AND TECH SUPPORT

PC WORLD

December 1993

300 Best Products



200 Award Winners

25 Bargain 486 PCs

40 Top Windows Utilities

25 Best CD ROM Titles

10 Hottest Products for 1994

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Notice, there is no asterisk to qualify that statement. No special connections are required to make our readers run at triple speed. And, you don't have to have an NEC computer or monitor. (Although it would be nice if you did.)

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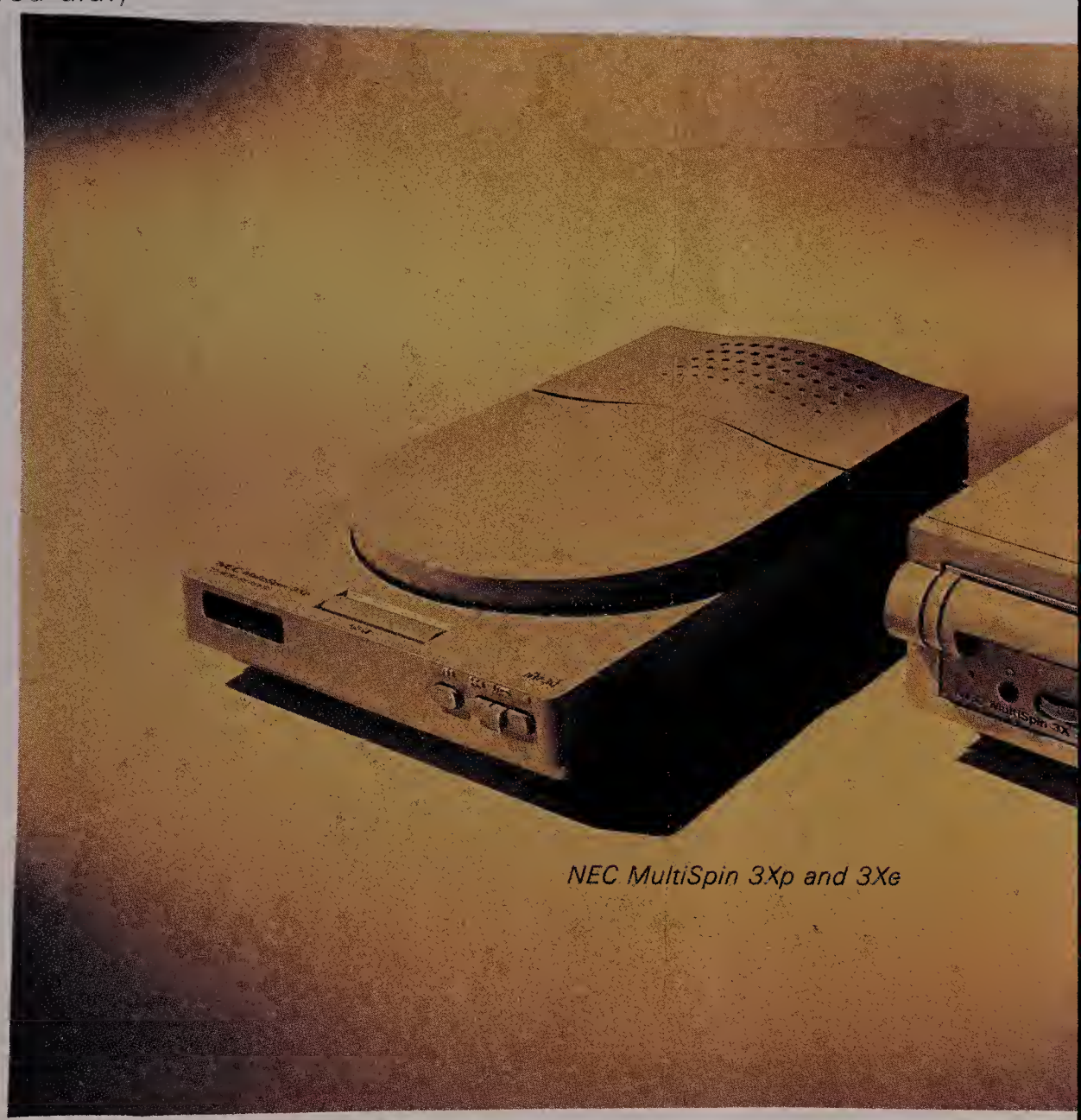

NEC MultiSpin 3Xp and 3Xe

OK, so now we've done what every true computer ad must do. We've filled your head with a long list of numbers and specs. But, what does it all mean?

Well, it means you can get your information three times faster than you can with standard readers, see smoother animation and video.

And then there are the really important questions. Like is our CD-ROM reader easy to use;

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← Ok. It's fine print but it's just trademark stuff. Honest.

how much is it going to cost me; and, will it look good on my desk? The answers are: Yes; around the same that it will cost you for a 2X; and you'd better believe it.

Our new MultiSpin CD-ROM readers are not only fast but interactive and intuitive to your needs, with control and display features on the front panel that tell you exactly what's going on (or not going on) at all times. They also have stand-alone audio controls so you can play music CDs without a computer. And there's a complete line of NEC interfaces, which include easy-to-use installation software. So you won't spend half your life trying to hook your reader up.

They're compatible with Macs and PCs, as well as Kodak Multisession Photo CDs. And they come with the longest commitment in the industry – a 2-year limited warranty.

For more information on our new MultiSpin 3X CD-ROM readers, call 1-800-NEC-INFO now. Or, for immediate details via fax, call NEC FastFacts™ at 1-800-366-0476, request document #23768.

We'll answer any questions you may still have about CD-ROM. And (this is the best part) you'll actually get to have an honest conversation for a change.

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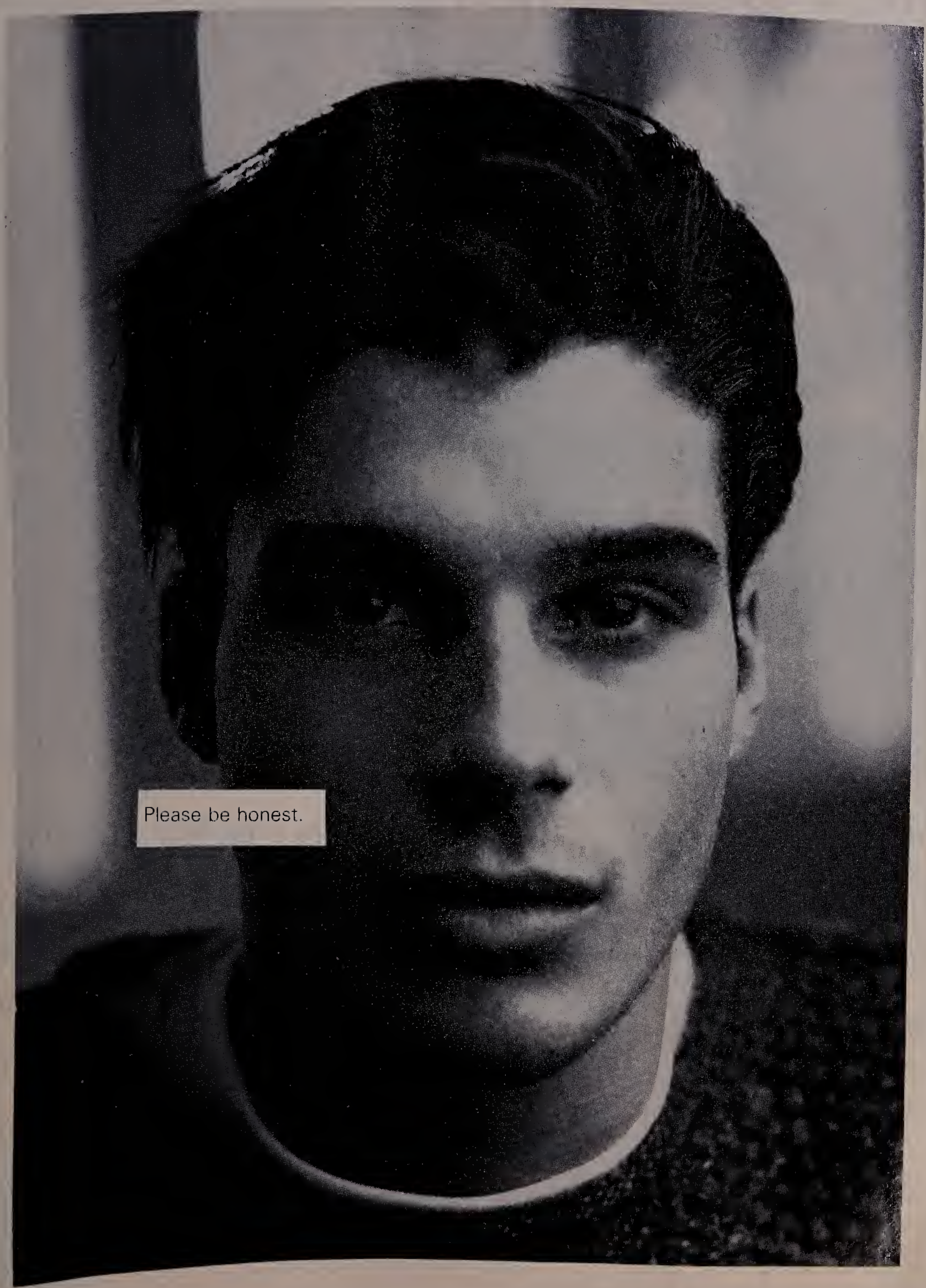
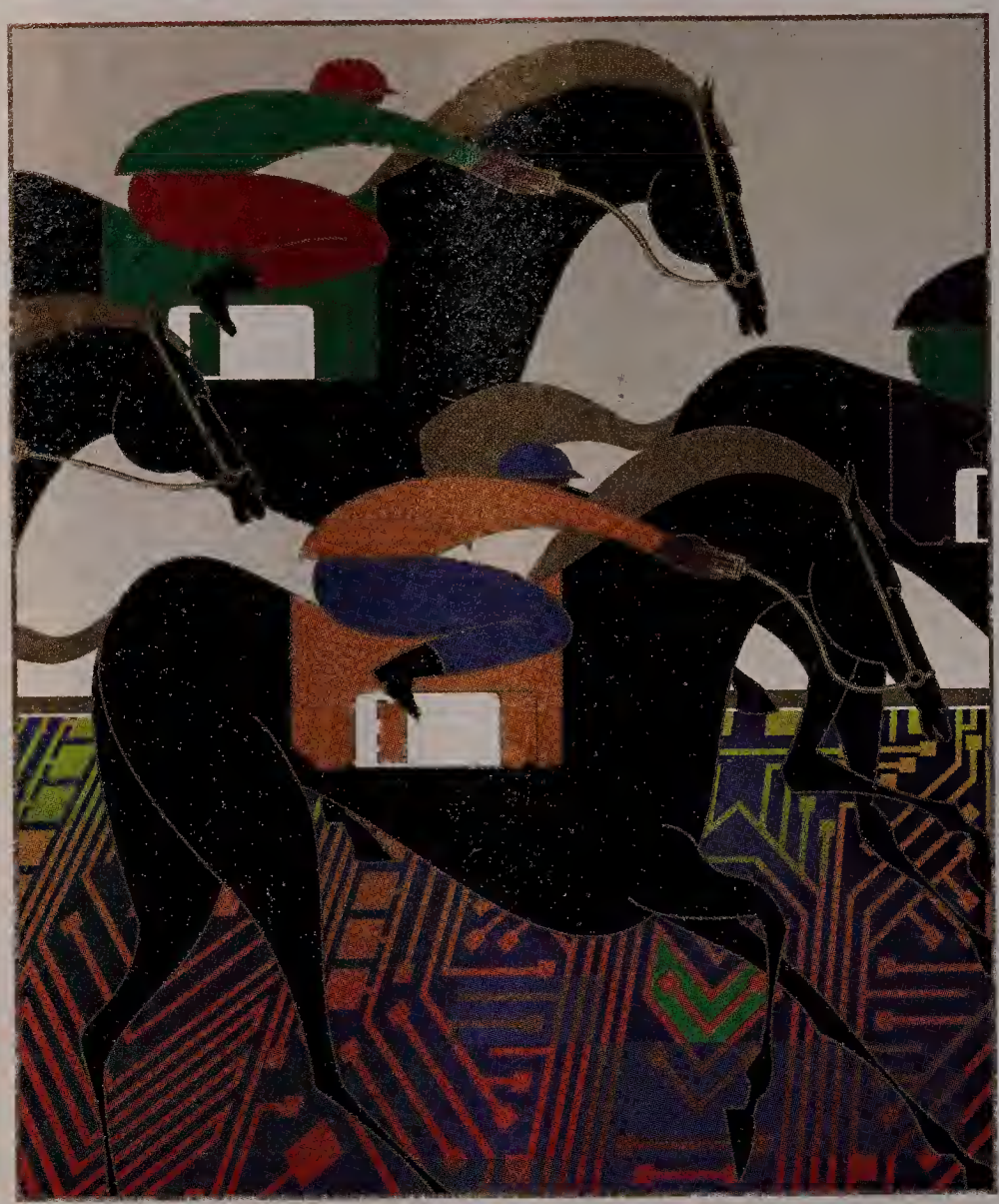

Please be honest.

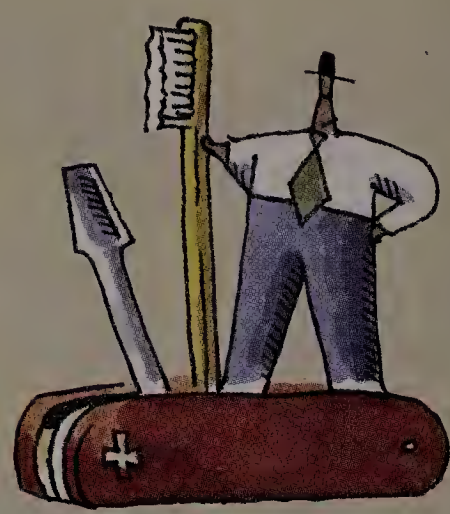
PC WORLD



Systems

176 The Most 486 for Your Money

Ask 29 PC makers for their best 486s for $2500 or less, and what do you get? Huge variations in price and performance. Our reviewers' picks for the budget-minded: five Best Buy PCs based on Intel's 486DX2-66 and IBM's flashy new Blue Lightning and 486SLC2-66 chips.



p. 252

221 VL vs. PCI: Betting on a Bus

The question is no longer whether to buy a PC with a fast local bus, but which bus to buy. We sort out the differences between the two high-performance local buses vying for the desktop.

Cover Story

154 Top 200 Products

More than 18,000 readers voted for the best hardware and software of 1993 in *PC World*'s 11th annual World Class Awards. The keynote this year? Innovation. We report on the top products in 50 categories and reveal our choices for the winners of 1994.

Special Report

279 Small Office/Home Office

From high-rise to home: Armed with PCs, software, and know-how, droves of ambitious entrepreneurs are cutting the corporate cord. Here's advice from the experts on how to set up a small office that works.

282 Making the Small Office Work
290 Best Voice Forward
293 Taxes and the Home Office
300 Tools of the Trade
312 Information, Please
314 Fax Survey

Top of the News

78 Plug and Play Comes to Compaq's Deskpros, Pentiums, Prolineas, Presarios

82 AST, DEC Roll Out Pentium and 486 PCs With PCI Local Bus

84 Excel 5.0: More Accessible, Flexible, and Integrated

94 MS-DOS 6.2: DoubleGuard for DoubleSpace

96 Toshiba 486 Notes Bring Sound and Color to Presentations

98 Charisma: Presentations Go Multimedia

99 PC Tools Pro for DOS: Safety Plus

100 New Keyboards, More Comfort

Cover photograph by Robert Cardin, digital composition by TX Unlimited/San Francisco

VOLUME 11
NUMBER 12

p. 176

Windows

252 New, Improved Windows
A buyers' guide to 40 low-cost utilities—printing add-ins, screen capture and graphics utilities, task-switchers, and more—that pick up where Windows leaves off. Plus a handful of must-have utilities for every Windows desktop.

Service and Support

216 Win a 486DX2-66 PC
How satisfied are you with your PC? Have you had problems? Or is your PC trouble-free? Tell us about it. Fill out and fax in this month's survey for a chance to win a Polywell Poly 4586VR, a Best Buy PC featured in this month's system review.

CD ROMS

239 Great CD ROMs for Fun and Profit
Software publishers promise "exciting" CD ROM disks crammed with information, sound, photos, and video. Is there substance behind the promises? When screening dozens of disks, our reviewer uncovers plenty of fakes and 25 gems.

p. 239

New Products

105 Austin 486 DX2-66, TI TravelMate 4000E
106 HP ScanJet IIcx
106 DEC LP Value Line 486 desktop PCs
108 Lexmark IBM 4037 5E laser printer
108 Philips Brilliance 1520AS, 1720DC, and 2120DC monitors
114 ATI MediaMerge 1.0, Adobe Premiere 1.0
116 Corporate Vision 1.0 data analysis software
116 XyWrite for Windows
118 Aldridge Cache86 5.0
118 MultiMedia Works 1.5
120 Ecco Simplicity personal information manager
120 Eclipse Find Windows file manager
122 Toolbox for Windows
122 Dyno Notepad
124 Zenographics ZScript
124 BookMaker ClickBook
133 Micrografx SnapGrafx 1.0
133 View Software QuickFind
134 Intuit QuickBooks 2.0
134 Norton Desktop for Windows 3.0
135 E-Mail Connection, MailPlus
136 QmodemPro 1.51, QmodemPro for Windows
136 DeskPorte Fast, TravelPorte Fast modems
138 Intel PCMCIA Faxmodems
138 Chameleon NFS
140 Quick Takes

Here's How

316 Help Line
324 Spreadsheets
334 Word Processing
347 Windows
354 Data Management
360 Publishing & Presentations
368 Communications
370 Hardware
376 Star-Dot-Star
383 Instant Reference Card
Microsoft Word 6.0 for Windows

Departments

17 In This Issue
23 Letters
33 Consumer Watch
45 Real Problems, Real Solutions
51 Inside Source
423 Break Time
426 Home Office

Resources

10 How to Contact *PC World*
388 PC World Catalog
398 Mail-Order Shopping Guide
419 Advertiser Index
421 Editorial Product Index
424 Coming Up

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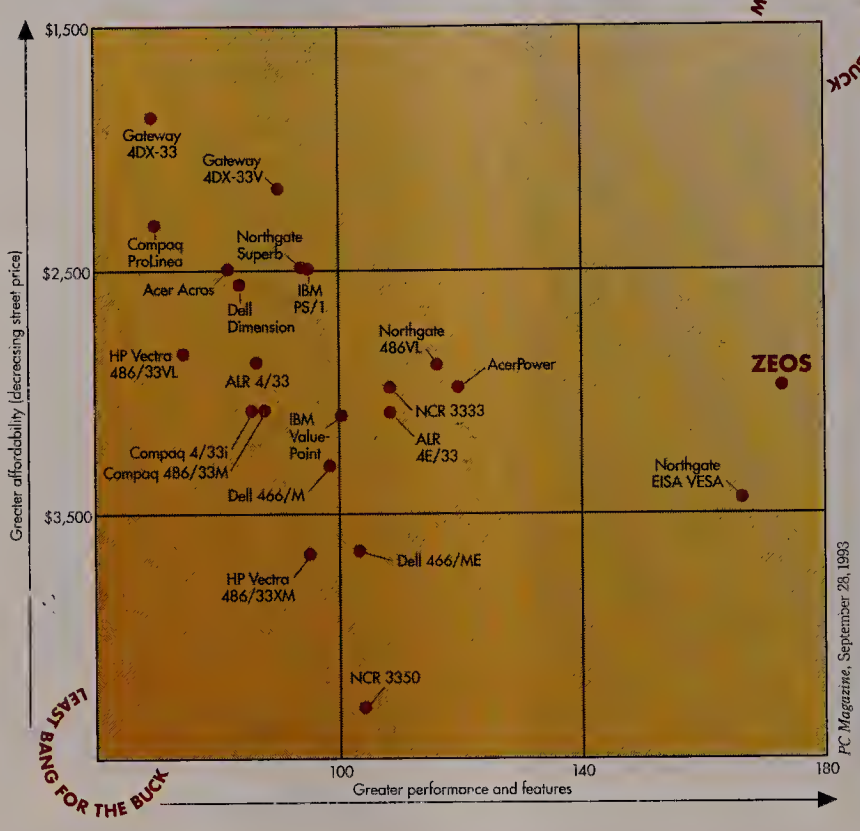
PC MAGAZINE REVEALS:

The Computer That Gives You The Most Bang For The Buck.



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Others pale in comparison. There's no way to dispute it! The results are in, and the ZEOS Upgradable 486DX2-66 is "the overall performance winner."

PC buyers expect low prices, top-quality, impeccable performance and prompt support. Basically, they want the most bang for their buck. *PC Magazine* recognized this and compared value-line PCs with more traditional systems to see if they were "truly good values or stripped-down machines trying to pass for good buys." The results are overwhelmingly in ZEOS' favor. In fact, *PC Magazine* said: *"ZEOS doesn't sell a separate value line, but the flexibility of its main system may be the least confusing solution of all."*

intel inside

Stacked against Gateway, Dell, Compaq, IBM and others, ZEOS stood alone. Using the benchmark tests as a guide, *PC Magazine* made these conclusions:

"As DOSmark scores are heavily weighted for processor and hard disk performance, the ZEOS garnered the first-place position in that category as well."

"The clear winner is...the ZEOS Upgradable, which turned in an incredible score of 55.01 megapixels per second."

"The real highlight among tested hard disks was the Seagate ST3600A, which has 12-ms access time and 256K of built-in cache. The ZEOS 486DX2-66 Upgradable's hard disk performance was almost 31 percent above the average in this roundup."

Of the *"systems that demonstrated the best agility under strenuous exercise of all their components... ZEOS (scored) 26 percent above average."*

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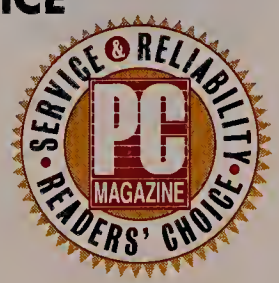

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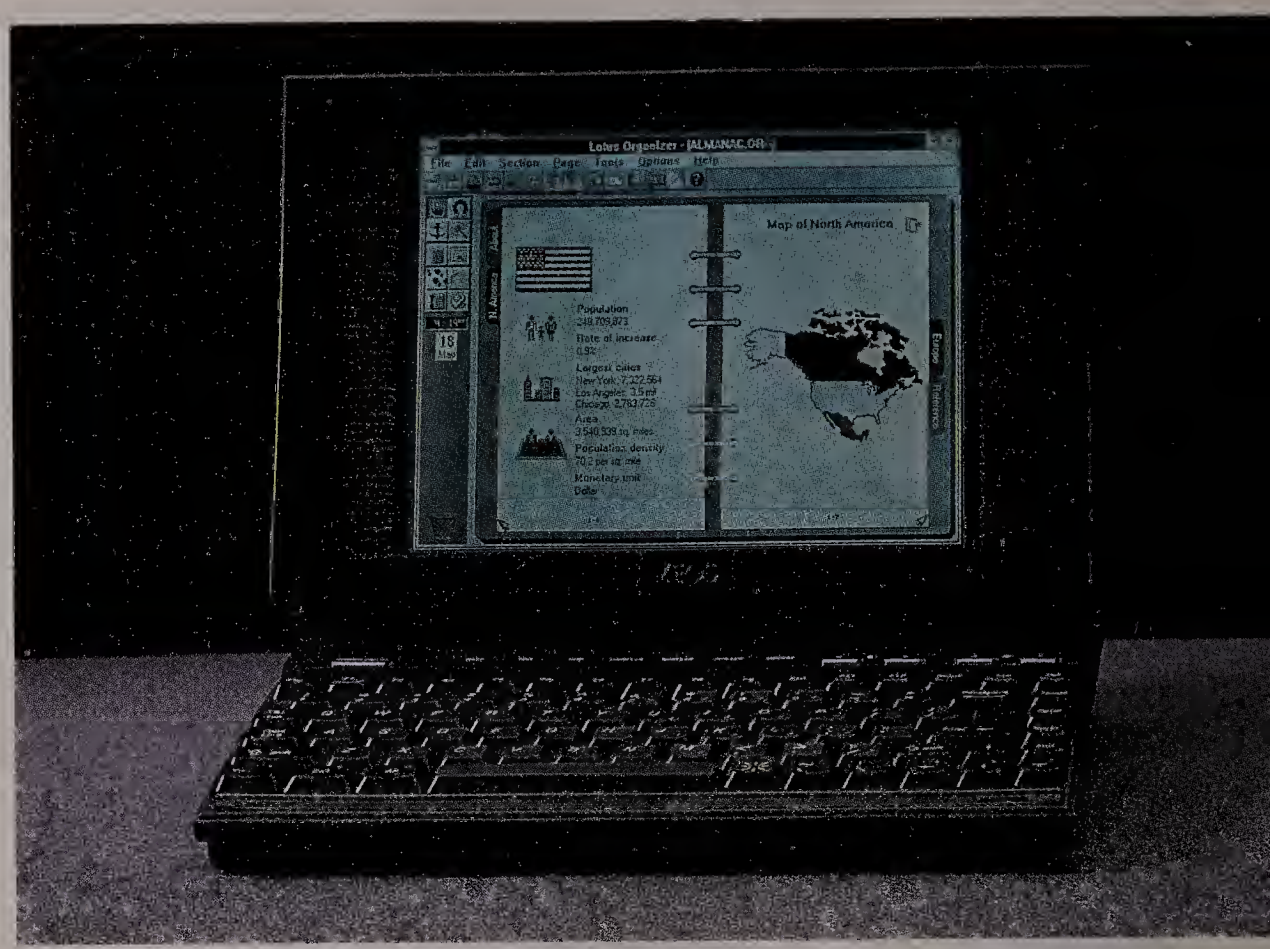

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486SL Freestyle: $1695 Lease $61/month	**486SL Freestyle: $1995** Lease $72/month	**486SL Freestyle: $2495** Lease $90/month
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■ 80MB IDE hard drive	■ 120MB IDE hard drive	■ 180MB IDE hard drive
■ Microsoft DOS	■ Custom nylon carrying case	■ Internal 2400 bps V.42 bis modem with 9600 bps send/receive fax
	■ Microsoft DOS	■ Custom leather carrying case
	■ Microsoft Windows	■ Extra battery
		■ External charging stand
		■ Microsoft DOS
		■ Microsoft Windows

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the Contenda has plenty of power to run Windows. You'll also find you can work longer because the processor is intelligent enough to power-down the memory, disks, modem and more when they're not in use. In addition, the compact package includes a built-in trackball and high-resolution backlit screen.

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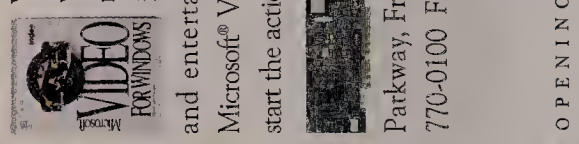

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Circle 191 on reader service card

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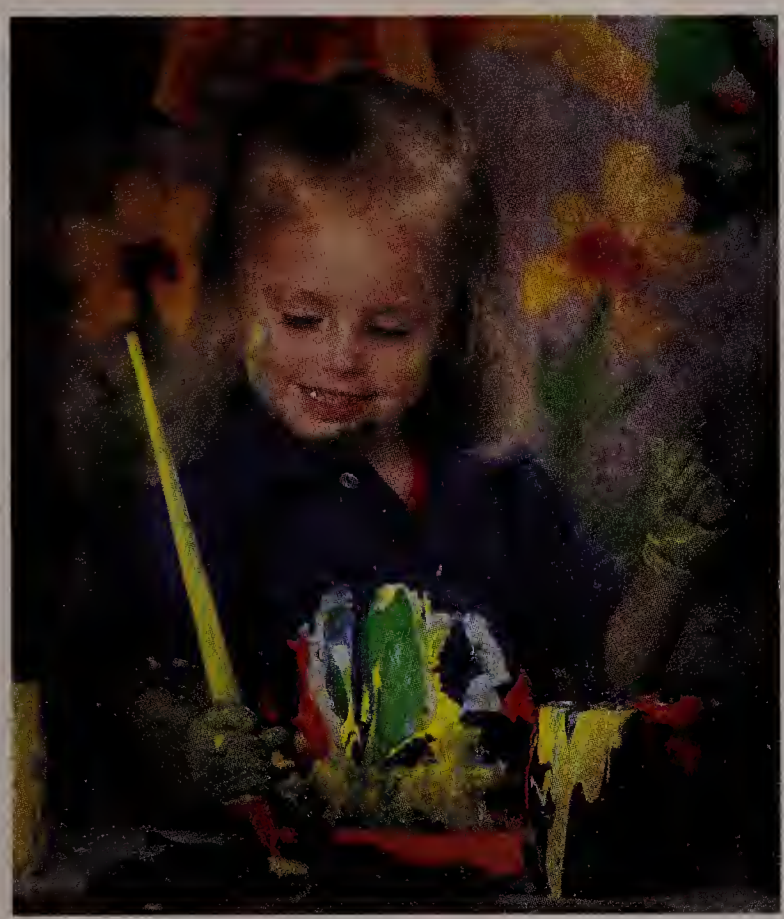

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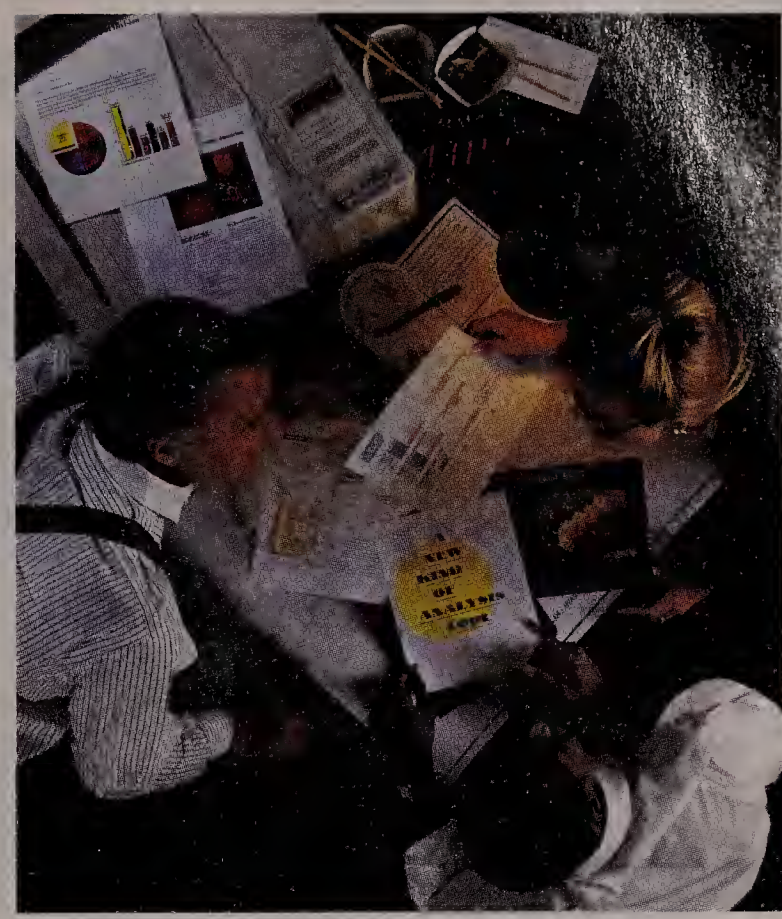

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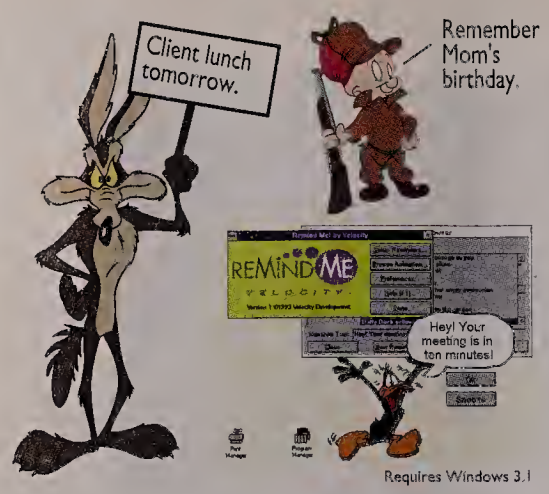

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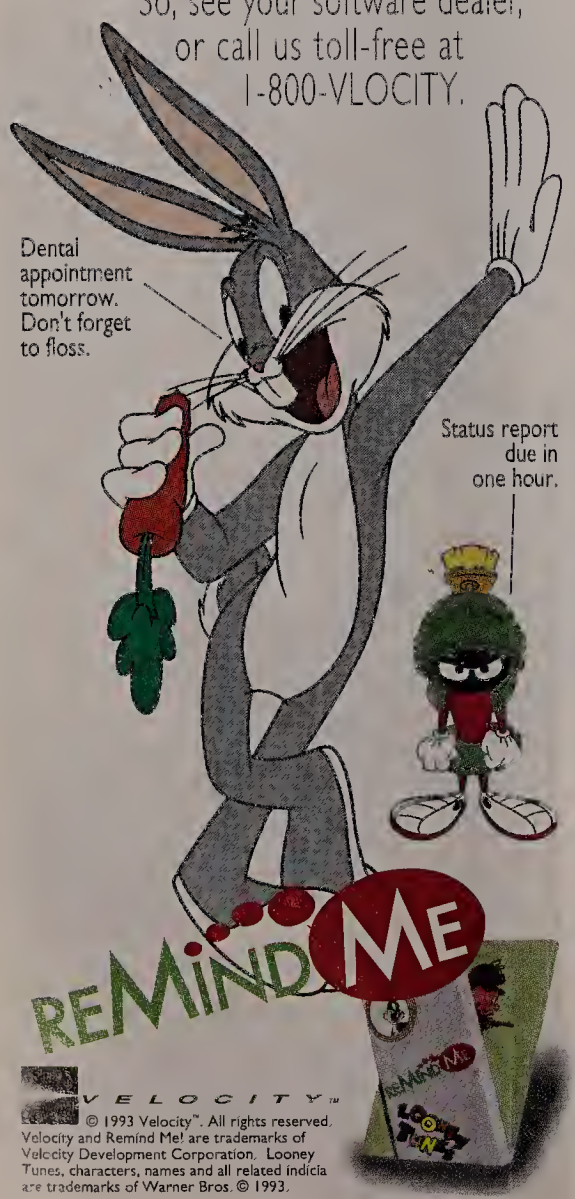

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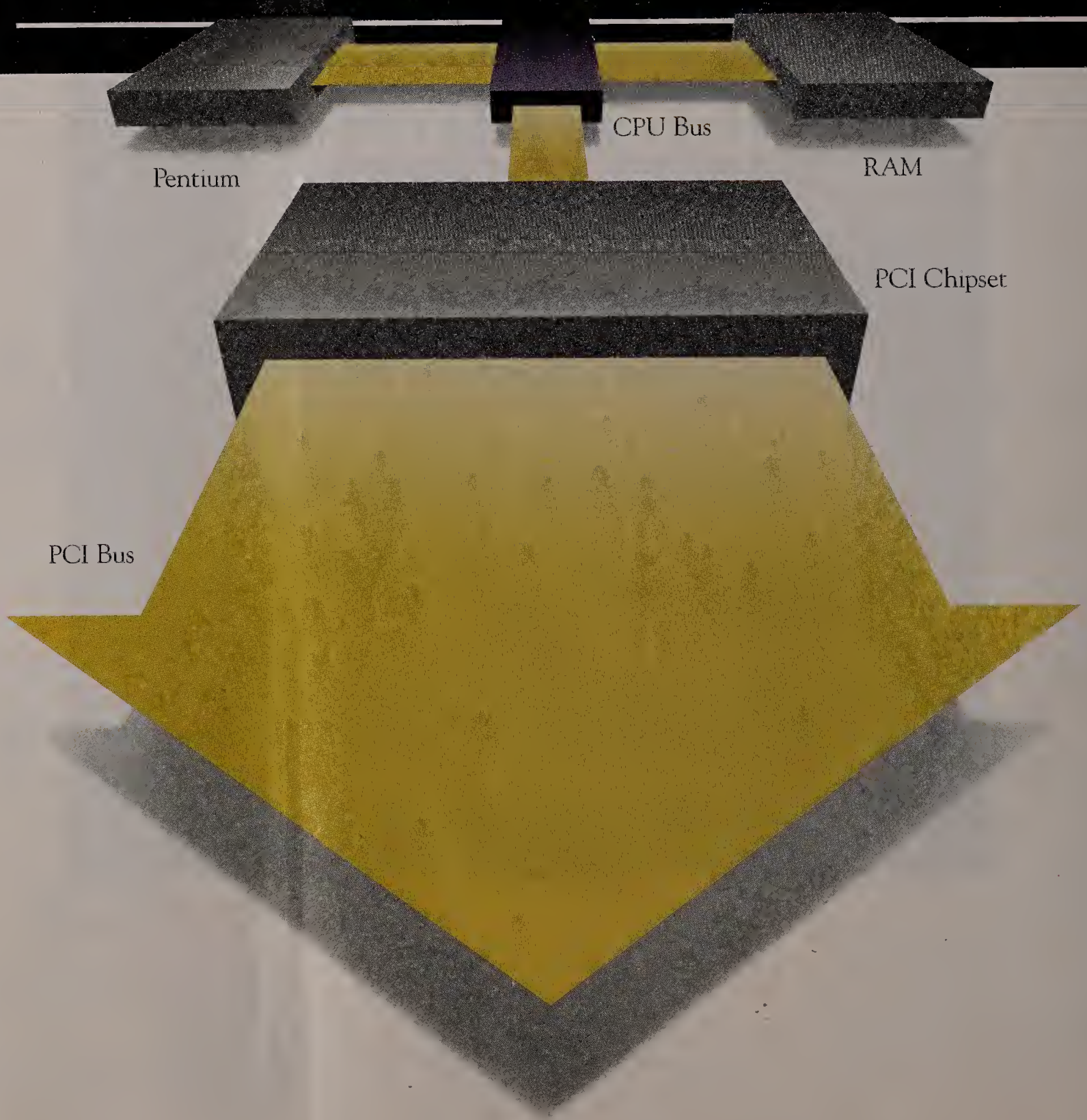

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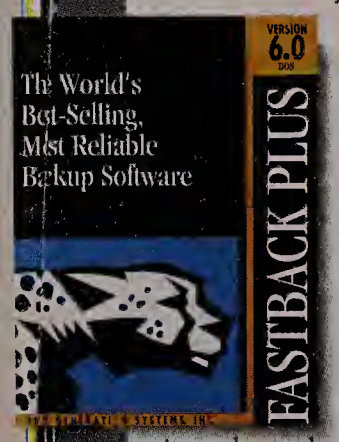

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Small Office, World Class

Whether by choice or necessity, thousands of professionals are leaving giant corporations and joining small companies or starting their own. Big corporations are trying to become more profitable by shedding employees and overhead. Ironically, discarded employees often become contractors for the corporate giants they've left—or even highly efficient new competitors. This sea change in the economy works hardships on some, but offers opportunities for those equipped to seize them.

That's where we hope our special report, *Small Office/Home Office*, will help. This report, edited by Senior Editor Steve Fox, is the first in a quarterly series on this topic, and it adds to our popular monthly *Home Office* column. We cover all the basics in establishing and operating an effective small office, whether you're going it alone or supplementing your day job. "Making the Small Office Work" examines issues that you're likely to overlook in designing your office space, including convenience, comfort, lighting, electricity, safety, and so on. "Best Voice Forward" discusses your best options for handling the telephone when you're out of the office. "Taxes and the Home Office" tells the awful truth about what's deductible and what's not under the IRS's strict rules. "Tools of the Trade" provides an introduction to the types of software and hardware that you're most likely to need. And "Information, Please" tells where to look for additional information.

The first place you should look, however, is Contributing Editor Steve Bass's popular *Home Office* column. Each month Bass brings ingenuity and wit to bear on a specific home-office problem and identifies specific products that solve it. In this issue, he tackles two problems that have plagued users since PCs first appeared: addressing envelopes and printing labels. A single page of Bass's advice can save years of headaches.

The next place to turn when equipping your office is this issue's 11th annual World Class Awards winners, as revealed in Bronwyn Fryer's "Top 200 Products." Based on responses to a write-in ballot distributed in 1,300,000 copies of the June 1993 *PC World*, Fryer's article reports the top five products in each of 50 categories, hardware and software alike. Products that win or place in the World Class Awards have proven themselves in the hands of thousands of PC users. This year's World Class Awards featured major battles in major categories. Microsoft's Access challenged Borland's Paradox for best database. IBM's ThinkPad 700C went head to head with Gateway's Nomad 450DXL notebook computer. Lotus's Freelance Graphics for Windows displaced Software Publishing's Harvard Graphics for DOS, but Harvard Graphics for Windows and Microsoft's PowerPoint also gained ground in the graphics category. In word processing, we saw a four-horse race among WordPerfect for DOS, Microsoft Word for Windows, Lotus's Ami Pro, and WordPerfect for Windows. Quattro Pro for Windows and 1-2-3 for Windows still trail Microsoft Excel, but both are gaining in the spreadsheet race. If you're shopping for a particular piece of hardware or software, looking at the top five in a given category is an excellent place to start.

Products that win or place in the annual World Class Awards have proven themselves in the hands of thousands of PC users.

"Top 200 Products" also features a select group of products that our staff and contributors think will be among the biggest winners of 1994. Ranging from Kiplinger's CA-Simply Money to Compaq's all-in-one Presario home computer, these products are innovative and imaginative (although we do knock the Presario in our system review because of slow performance and limited expandability; its considerable virtues lie elsewhere).

If you're outfitting your own office, you should definitely read "The Most 486 for Your Money." Some 29 bargain-priced machines compete for top honors, and seven different processors are represented: Intel 486DX2-66, IBM Blue Lightning, IBM 486SLC2-66 (in an Eltech system), Intel 486SX, and others. *PC World* compares PCs based on different processors because we're always seeking the best value for you. The surprise overall winner this month comes from Ambra, IBM's new direct-mail offspring.

Two Chances to Win 486s

This issue also gives you two chances to start your small office with a bang by winning a great PC. To enter the contest for the Best Buy PC in this month's system review, just fill out our Service and Support Monitor on page 216 and fax it our way. *Small Office/Home Office* also contains a survey form, this one seeking your feedback on the editorial content of this first special report and additional information about your needs in small and home offices. If you win the small-office drawing, you get a handsome, compact Presario that looks at home anywhere.

Phil Lemmons

Phil Lemmons, Editor in Chief

MICHELE CLEMENT

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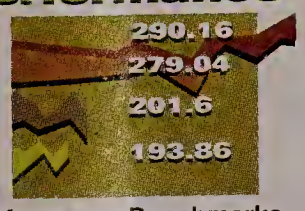

InfoWorld SYSmark 92 Performance Benchmarks
Higher score represents better performance

While most of today's Pentium processor systems are merely upgraded versions of existing 32-bit i486-based PCs, the ALR EVOLUTION V and the EVOLUTION VQ were engineered from the ground up to take full advantage of this advanced, 64-bit CPU. With support for the Pentium processor's wider data path and high performance write-back mode, these powerful systems easily outperform their less sophisticated competitors.

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Larry Trucho
Owner
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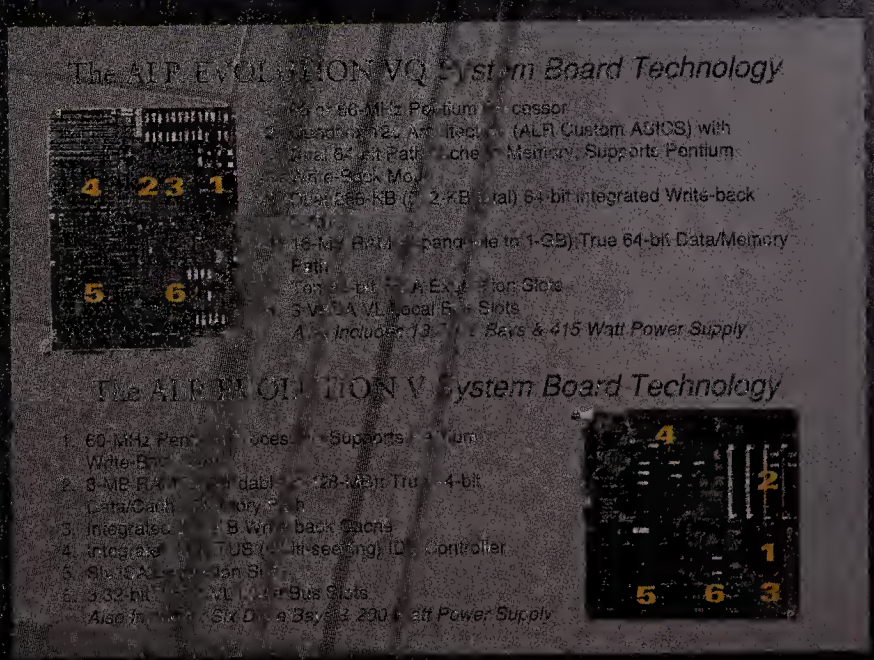

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INFO WORLD
September 27, 1993

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above features with 66-MHz Pentium

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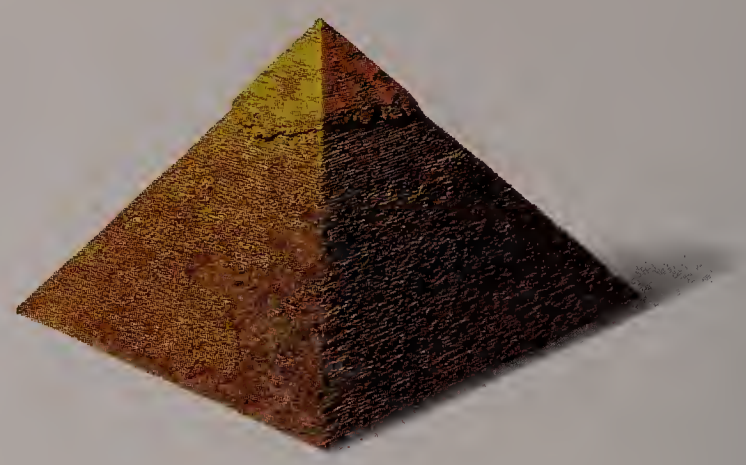
Circle 9 on reader service card



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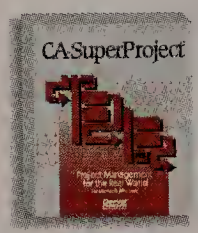

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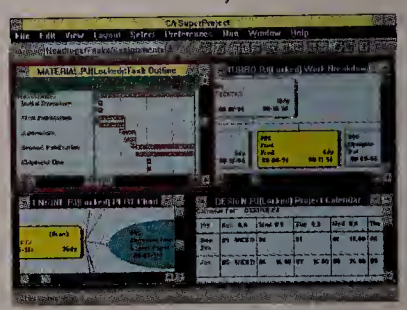

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Circle 78 on reader service card

Invisible Rat, Shopping in the Dark, Does Payback Pay Off?

Concept or Real Product?

I'm writing to protest your practice of reviewing concepts of products rather than actual shipping software. I'm referring to September's *Top of the News* story "User Group Puts PIMs to the Test." As of August 15, PackRat 5.0 still does not exist. I know—I've been waiting since April for a working copy.

The people at Polaris (home of PackRat) did indeed ship a box with some software in it around the first of July, but the staff admits that it would not load and did not have all the promised features. As of today, Polaris is still "working some bugs out" and is going to ship the program in "just a few days."

The user groups who examined PIMs for the September story must have been using something other than PackRat 5.0. If you are reviewing a concept, please say so. If you put pressure on Polaris (or any vendor) to present a working copy for your review, then we, the public, won't be asked to buy trash based on your expert opinion.

Tom Sweeney,
Greenville, South Carolina

Editor's response: Because of the long lead times involved in preparing a monthly magazine, we often look at beta software when preparing new product announcements and news stories. For the September news story, groups looked at a beta version of PackRat, a fact that was inadvertently omitted from the write-up. When looking at beta software, we feel it can often be misleading to point out bugs or speed problems, which are generally corrected before the product ships. At press time Polaris assured us a shipping version of PackRat 5.0 would be available by the time our September issue came out. Unfortunately that proved not to be the case. Sweeney's points are good ones, and in the future we will take care to indicate "expected" ship dates, as well as to tell readers when a product we test is not a shipping version.

Visual Input

I was interested in the September article "Input Devices: Finding the Perfect Touch" about new keyboards, mice, and trackballs. But I was disappointed by the lack of pictures. I'm shopping for a new mouse or trackball and would have liked to see some of the new designs. Maybe they all look alike, but you publish pictures of all the systems that you review, and if you have seen one of those, you've definitely seen them all.

Adam Wall via
PC World Online

Editor's response: You are right, without photographs it's difficult to know whether you're interested in trying out one of the new and different input devices. Unfortunately, space was limited, and we opted to include as many products as possible rather than run photos.

A Question of Payback

Thank you for mentioning our products in your September article "Instant Payback Software." For a small company like ours, it's flattering to be noted in your magazine. However, I would like to correct some common misconceptions that crept into the sidebar "Printing Your Own Money."

You say about MICR laser printer toner cartridges, "The cartridge uses magnetic ink to print checks that your bank can read with optical character recognition (OCR) devices." While it is technically true that a bank could use OCR technology, banks are *required* to use magnetic ink character recognition (MICR) technology. This means that the recognition device at the bank detects the iron content of the ink in order to recognize the shape of the character. A MICR toner cartridge has enhanced iron content to make this process more reliable. Until similar iron-based inks are available for desk jet, ink jet, and bubble jet printers, their font characters will not be magnetically readable.

Sal Cambareri, Chief Developer,
Laser Max Software, Portland, Oregon

MICHAEL BARTALOS

What About OS/2?

I would like to see more information in your magazine about OS/2. *PC World* is my main computer magazine, and I enjoy reading it. However, I have had to go to other sources to read about OS/2. I don't necessarily want major articles, just some acknowledgment that OS/2 exists. The OS/2 minority is growing, and we are an enthusiastic group.

Dalton McInnis, Wichita, Kansas

Editor's response: We have heard from this growing, vocal group and as a result will be featuring a new column starting in the January issue: *Here's How: OS/2 Q&A*.

I'll Put Money on the Little Guy

Your August article "Top Ten Utilities vs. DOS 6.0" must have been the most laughable defense of Microsoft I have read since the release of DOS 6.0. Nothing could be further from the truth than your description of Microsoft's offering as "relatively stable, compatible, and bug-free." Poor performance and

Of course, there are some things more exciting than waiting for graphics.

Indeed, time waits for no one. It only seems that way when you're waiting for your applications. Fortunately, there's a simple solution: the Premmia™ desktops from AST. Both desktops have local bus graphics and an integrated cache. As well as the ability to display over 16 million colors. (Just don't ask us to name them.) In simpler terms, that means extremely clear graphics in an extremely timely manner. As in, instantaneously. It also means faster text scrolling and screen updates – even faster data transfers. (Can they *ever* be fast enough?) And you'll also have access to sophisticated full-screen, full-motion video. To find out more, please call us at 800-876-4AST. You might as well do it now. While you have the time.

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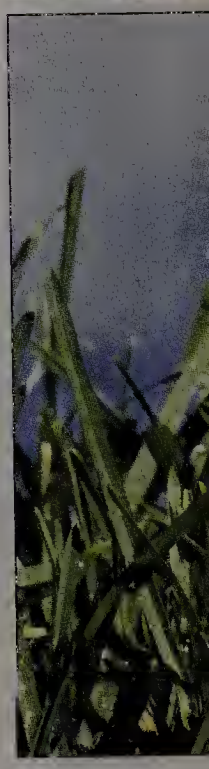

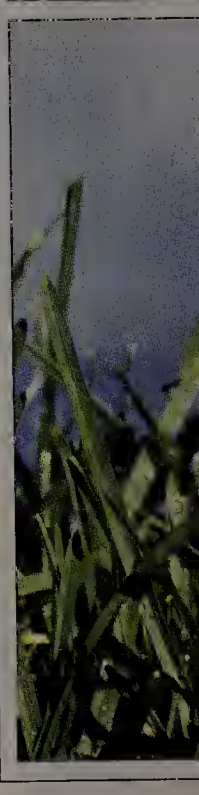

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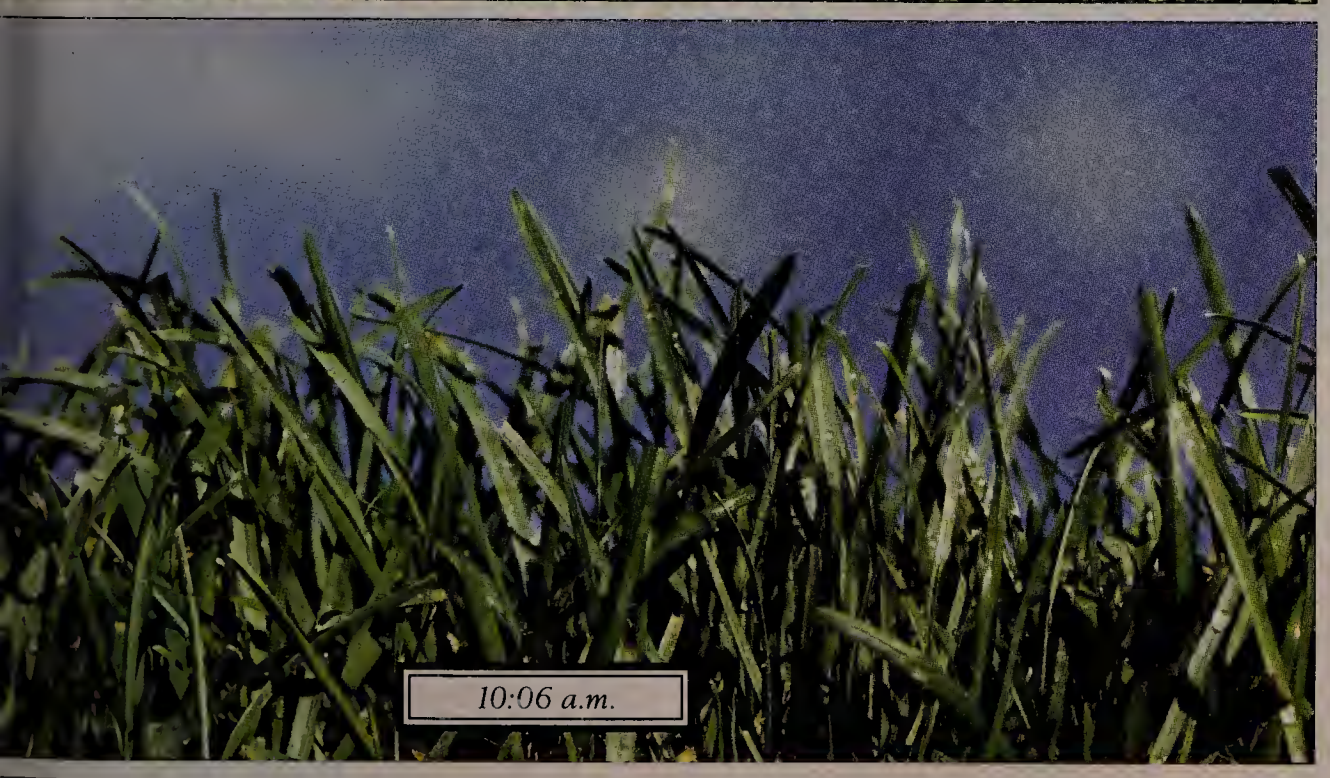

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features and extremely poor reliability are reasons enough to consider buying a full-blown utility package. In the disk compression category, the article notes DoubleSpace's lack of crucial maintenance utilities and numerous complaints about lost data, while no such problems are reported for Stacker or SuperStor. Nevertheless, you couldn't declare a winner in this category. Stop hiding your heads in the sand!
Marc Couture, Sherbrooke, Quebec

Author's response: I hardly think my review was a bouquet to Microsoft. I clearly identified DOS's failings—the lack of an uninstall option for DoubleSpace, MemMaker's less-than-thorough pursuit of upper RAM, no tape backup, DOS's sometimes mercurial temperament, and Microsoft's "What, me worry?" response to user complaints. I also noted the rising incidence of complaints from *some* users. But I also felt the need to point out that the tests I conducted on various systems didn't reveal any critical problems. I can only report on what I found. —*Robert Luhn*

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Circle 200 on reader service card

Environmentally Sound?

As stated in September's *Real Problems, Real Solutions*, it is highly laudable that the World Bank has established sound environmental design and purchasing criteria resulting in energy savings and "green" computer buying policies.

Here is the rest of the World Bank environmental story. According to Bruce Rich of the Environmental Defense Fund, World Bank spent half a billion dollars to finance a road 1000 miles into the Amazon, resulting in the highest rate of deforestation in the entire Brazilian rain forest and one of the worst outbreaks of malaria in recorded history. The bank then approved a $90 million emergency loan to spray DDT to control the malaria.

Kudos for World Bank's environmental leadership? I don't think so.
Charlie Knutila, Seattle

Money Is Green, Too

Count me among those who will not pay one penny more for a low-power-consumption desktop computer [*Consumer Watch*, August].

I'm aware that my desktop PC consumes power. I'm also aware of the electric power consumption of the lighting, air conditioner, fax machine, copier, elevators, and even the water cooler. My desktop PC is pretty low on the list. I don't give a hoot for green—I do respect money. If a new PC can do more than my current one, uses less power, and costs the same or less, I'll buy it. I won't buy it just because it's green.

Your last sentence says it all: "Oh, and don't forget to turn out the lights." Offices waste more money on inefficient lighting than they do on energy-inefficient PCs.
Israel Switzer, Toronto, Ontario

The PIM Reaper

In reading "Are PIMs Ready for Prime Time?" in August, I was reminded that sellers of time-management systems—whether paper or electronic—believe that the entire world ceases to exist sometime between 5 and 9 p.m. and doesn't reappear until 6 or 8 the next morning. Or perhaps they believe that the people who do their

INTRODUCING THE PERFECT WAY TO GET AHEAD AT THE OFFICE.

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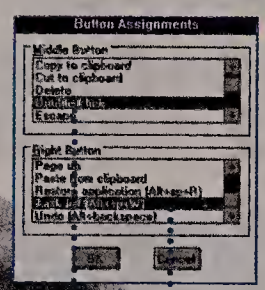
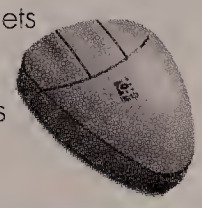


NEW MOUSEMAN® CUTS NEARLY 50% OFF THE TIME IT TAKES TO EXECUTE ROUTINE COMMANDS.*

Get a leg up on those other Joes with the mouse that makes it easy. MouseMan comes with software that lets you execute one of dozens of commands (including double click) with a single click, *without* fiddling with pull-down menus. We've taken the shape 77% of users called "most comfortable" and added finger grooves, lower force switches, teflon feet, and a more flexible cord.



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work at night bear too many cerebral similarities to kitchen appliances to maintain personal logs.

I assure you there is a great untapped market of intelligent, well-paid people who keep the world running in starlight. We are regularly stuck trying to put 10 hours of notes in the little white spot underneath 9 p.m. A real 24-hour-per-day PIM would go a long way toward selling me on one.
John G. Allan, North Street, Michigan

Author's response: You'll be happy to hear that both of our Best Buys—Lotus Organizer and Arabesque's Ecco Professional—come with 24-hour daily calendars, as do many of the other PIMs reviewed. So it *is* possible to plan your life round the clock using a PIM. —*Daniel Tynan*

I enjoyed Daniel Tynan's review of PIMs in your August issue. A major part of my job involves handling and delegating many tasks. When I first read about the development of PIMs in the early 1980s, I couldn't wait to purchase one.

When Lotus Agenda 1.0 was released, I immediately bought it (I now use 2.0). I have since purchased PackRat 4.0, Commence, and now Lotus Organizer. None of them has been as useful as Agenda. These new Windows PIMs require too much time to enter items and then link them between the different parts of the database.

I share Tynan's love of a graphical interface, but I have not found a PIM that can match Agenda's combination of ability and ease of data entry. It's too bad Lotus chose to abandon the product.
Ronald Felton, Miami Beach, Florida

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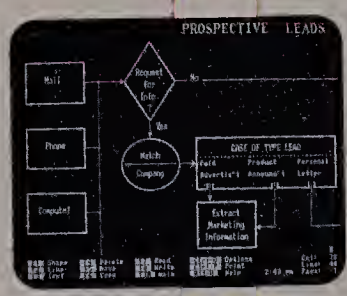

Plus, Flow Charting 3 is now available in a LAN version. Making it easy to share files and set up work groups for specific projects.

And it's backed with free technical support and a 90-day no-risk guarantee. So if you're spending too much time drawing charts, call for a free demo and see for yourself what makes Flow Charting 3 the best-selling flowcharting software.

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Circle 233 on reader service card

Faster and Faster

I eagerly awaited your September article "486 PCs With the Works." What a disappointment. With CD access speeds approaching half a second, how can you possibly call some of these computers multimedia? Slow CD speed is why I eliminated some of your Best Buys. For example, you rated the Eltech lower because of the slow CD drive, yet the AST—one of your expensive Best Buys—was even slower.

I want to upgrade my present system with a faster one. And yes, some of your Best Buys did have faster CD drives, but how about testing the complete system, not just portions of it?
Jake Tiefel, Kent, Washington

Editor's response: The AST we chose as a Best Buy included not only a CD ROM but voice mail and a tape backup unit as well. There's more to a complete computer than the CD ROM drive, so we rated these PCs based on the entire package. For a look at CD ROM drives, see our April 1994 issue.

Corrections and Clarifications

In the September and October issues, *Marketplace* listed the IBM PS/2 Model 85 XP 486 in the category of 486SX desktops. This model is more appropriate as a network server. A representative 486SX desktop unit from IBM is the PS/2 Model 77 486, a 33-MHz unit with 8MB RAM and a 212MB hard disk; it lists for $2835 and has an estimated street price of $2450.

PC World *welcomes your responses and ideas.* *See page 10 for contact information.*

THE EASIEST-TO-USE WINDOWS SPREADSHEET

What Lotus doesn't want you to know about new Quattro Pro 5.0

You get more!

Quattro Pro 5.0	Lotus 1-2-3 R4
1. "Experts" that do sophisticated tasks (like statistical analysis) for you	1. *Not!*
2. Interactive tutorials that teach you by using *your own* data	2. *Not!*
3. Complete documentation available *online*	3. *Not!*
4. Improv-like crosstabs and data modeling tools *built in*	4. *Not!*
5. Built-in workgroup information sharing with any network or E-mail system	5. *Not!*
6. Analytical graphs to find trends in your data	6. *Not!*
7. Over 360 @functions—more than any other spreadsheet	7. *Not!*
8. Integrated user interface builder to make spreadsheet development easy	8. *Not!*
9. Complete slide show capabilities *built in*, including light table sorting	9. *Not!*
10. Database forms that let you manage data without having previous database experience	10. *Not!*

Shhhhh! Lotus has a secret they don't want anyone to know. Quattro® Pro consistently ranks as the #1 spreadsheet in virtually every head-to-head comparison with both 1-2-3 and Excel. Take *PC Week*'s September review where Quattro Pro beat 1-2-3 in four out of five categories. Or *PC Magazine*'s annual customer satisfaction study where "Lotus lost the crown for overall satisfaction to both the DOS and Windows versions of Quattro Pro . . ."

Quattro Pro keeps winning because it has more power, more analysis tools, and is easier to learn and use. And now there are three brand new versions of Quattro Pro 5.0 (Windows, DOS, and Workgroup Edition) that are even better. The chart shows you how Quattro Pro's Workgroup Edition offers you built-in capabilities not found in Lotus 1-2-3 for Windows Release 4.

Now we'll let you in on *our* little secret. We want every Lotus user to try Quattro Pro, so we are making incredible introductory offers on all new versions of Quattro Pro.

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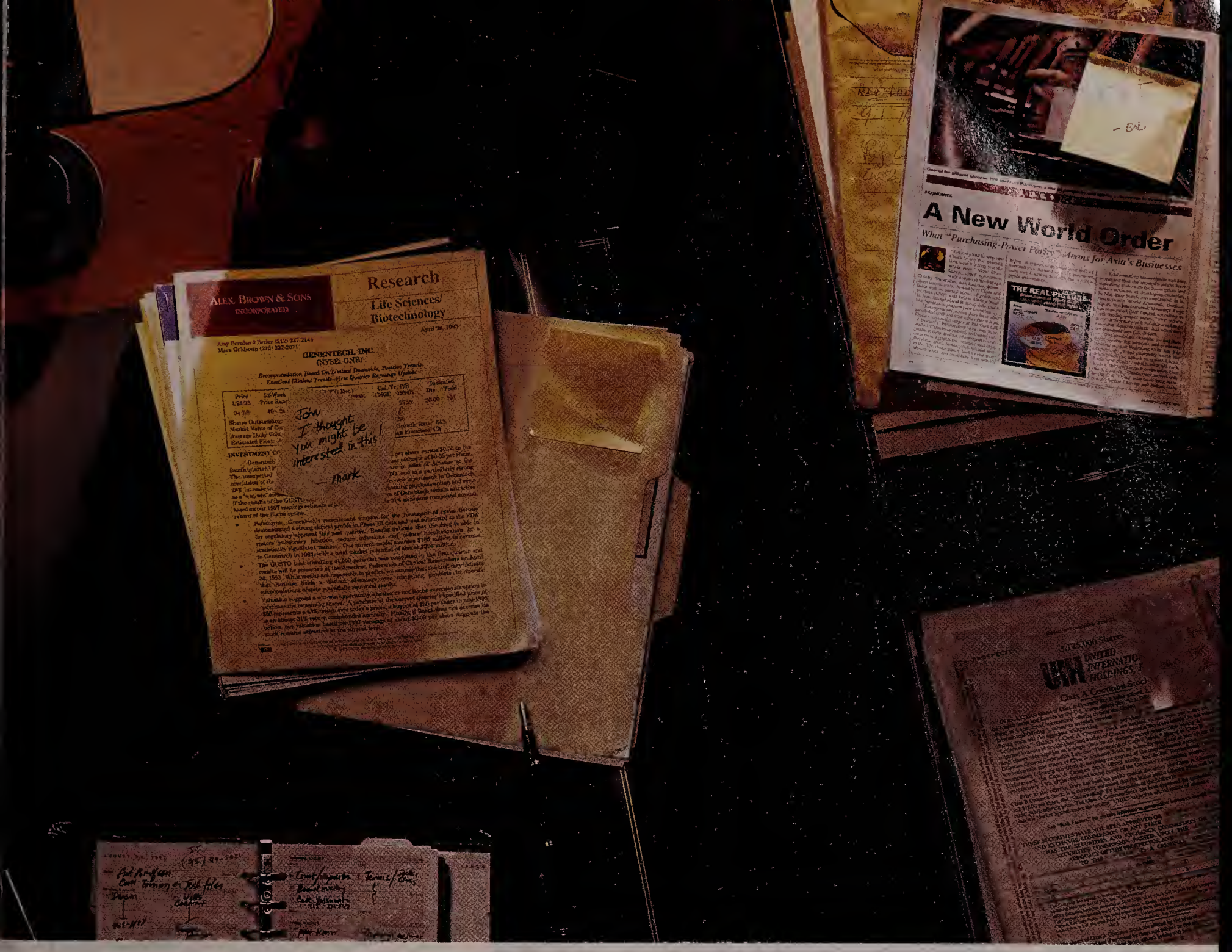

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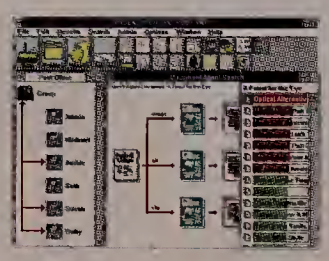
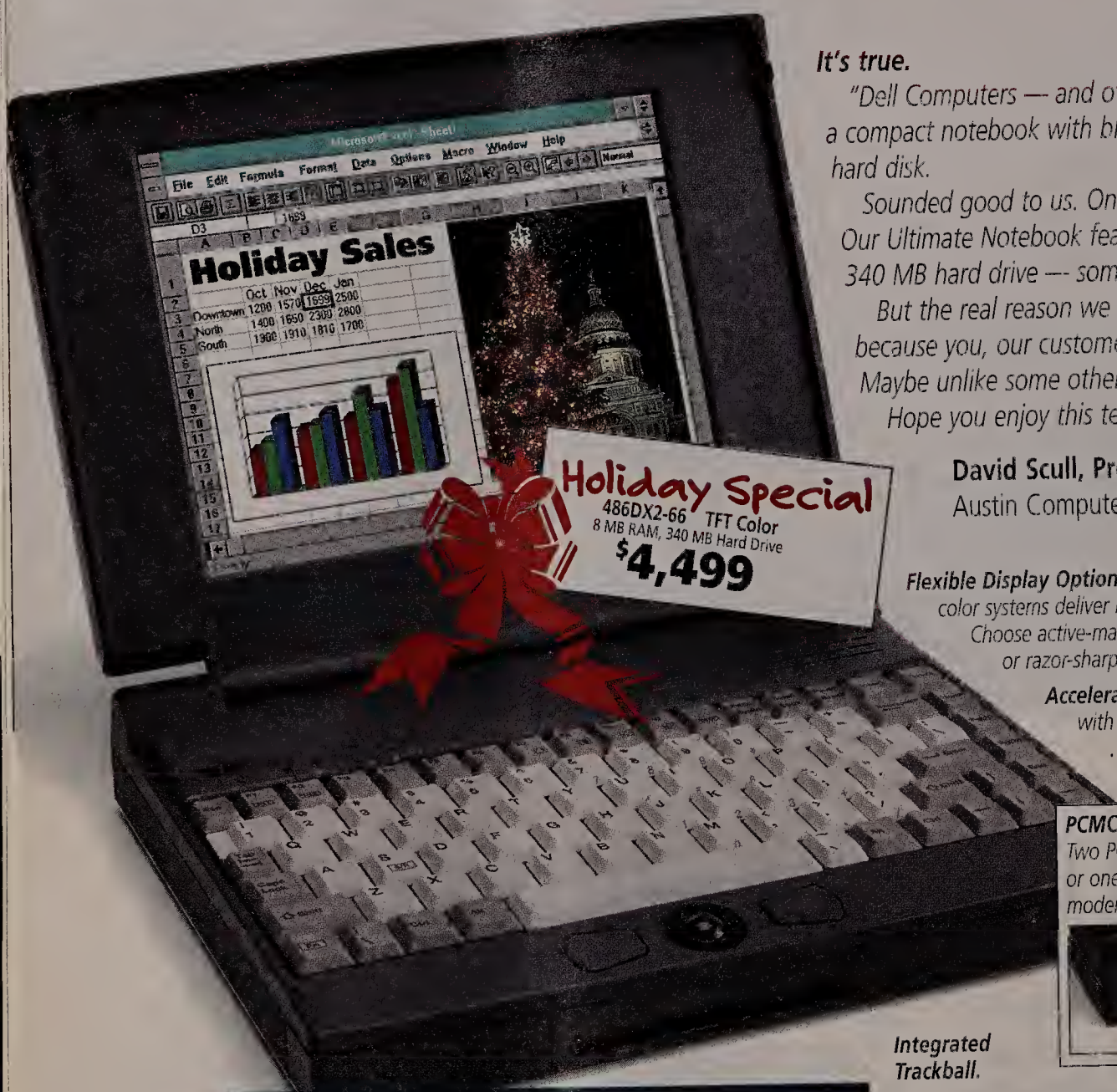


PageKeeper's Document Agent Search™ *lets you use any document as an example or "agent" to find other documents with similar content.*

PAGEKEEPER™

Circle 215 on reader service card

AUSTIN has what DELL wants for Christmas.



It's true.

"Dell Computers — and others — had a great idea: produce a compact notebook with blazing speed and a large capacity hard disk.

Sounded good to us. Only difference is, we made it happen! Our Ultimate Notebook features a 66 MHz processor with a 340 MB hard drive — something Dell just cannot seem to deliver.

But the real reason we pushed ahead with this product is because you, our customers, told us that's what you wanted. Maybe unlike some others, when our customers talk, we listen!

Hope you enjoy this terrific notebook!"

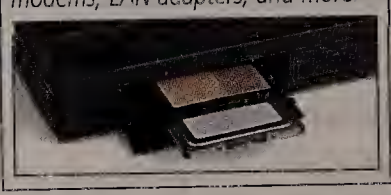
David Scull, President/CEO
Austin Computer Systems

intel inside

Flexible Display Options. *Austin's new Dual Scan color systems deliver bright, vivid color at a cost-effective price. Choose active-matrix color for the most demanding applications, or razor-sharp monochrome when color isn't needed.*

Accelerated Video. *32-bit local-bus video accelerator with 1 MB of VRAM — found in the hottest desktops ... and on all Austin Notebooks! Plus, simultaneous CRT and LCD display.*

PCMCIA Expandability. *Two PCMCIA slots takes two Type II or one Type III device for fax modems, LAN adapters, and more.*



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130 MB Hard Drive	130 MB Hard Drive	213 MB Hard Drive	340 MB Hard Drive

Memory	32 MB RAM maximum	**Battery Life**	2 to 5 hours
I/O Ports	1 Parallel, 2 Serial, SVGA, External Keyboard	**Preinstalled Software**	MS-DOS 6.0, Microsoft Windows 3.1
Diskette Drive	3.5", 1.44 MB	**Dimensions**	11.1" x 8.58" x 2.0"
Power Usage	<10 watts in Standby Mode, conforms to EPA Energy Star guidelines	**Weight**	6.3 lbs
		Warranty	1 year

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Circle 32 on reader service card

Sharing the Computing Wealth

Every day 200 million people use computers, but if you ask Alex Randall, the PC revolution hasn't even started yet.

That seems like an incredible statement, given the rapid pace of technical advances and the fairly pervasive use of PCs in U.S. businesses today. But, when you consider that there are some 5.4 *billion* people in the world, the digital revolution is passing by most of the world's population, says Randall, executive director of the Boston-based East-West Education Development Foundation.

The nonprofit group's mission is to "recycle" donated, used computers, placing them with human rights organizations, journalists, and fledgling democratic groups around the world, as well as with community organizations in the United States. The foundation is one of several groups throughout the country that breathe life into outdated and often abandoned PC hardware by repairing and redistributing it.

The Great Equalizer?

When the PC first appeared it was described as the great equalizer, but it hasn't worked out that way," says Ann Jochnick, program director of Computers and You, which offers computer training for disadvantaged children and adults in San Francisco's Tenderloin district. In many respects, says Jochnick, marginal groups are even more isolated today than they were ten years ago, in part because they don't have access to PC equipment.

To help correct the technological imbalance, Computers and You focuses on low-income clients, people who often don't have a roof over their heads or three meals a day, let alone a PC on which they can learn job skills or do schoolwork.

Across the country, the National Cristina Foundation redistributes donated PC equipment to partner organizations that use the hardware and software to help disabled and disadvantaged children. Its member groups range from the United Cerebral Palsy Foundation to the Carroll Center for the Blind in Newton, Massachusetts.

An Apple—or a PC—a Day

Much has been made about the often disgraceful state of computer technology in the schools, and several organizations have targeted public schools as the primary recipient of their redistribution efforts. Two such groups are the Detwiler Foundation in La Jolla, California, and The Computer Recycling Center in Mountain View, California.

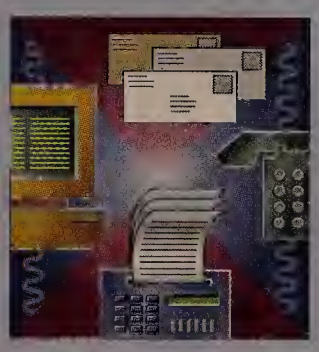
The Detwiler Foundation accepts volume donations of equipment and places it with school districts that have the resources to repair and support the hardware and software. The Recycling Center accepts individual or corporate donations of equipment, then repairs and supports the hardware after it's been placed in a school. And, in the process of fixing donated equipment, the Recycling Center is training dozens of volunteers in computer repair and maintenance—skills that are highly sought in a competitive job market.

As with the East-West Foundation, Non-Profit Computing in New York, has both a local and an international focus, placing donated equipment with such diverse groups as the City of New York's Department of Housing Preservation and Development and the University of Mongolia.

What You Can Do

Virtually all these programs—and dozens like them in communities throughout the country—have far more prospective clients than they have equipment to give. That's where you come in. Whether you're a department manager wondering what to do with your old XTs and 286s or a small-business owner who's finally been able to

KEEPING UP



Money-back guarantees are common these days, but Logitech, of Fremont, California, has taken the concept one step further. Use its new MouseMan Cordless for 60 days and if you like it, the company bills your credit card $99 *after* the trial period. If you don't like the fit, send it back. Call 800/732-3127 . . . It's the state's responsibility to institute worker safety regulations, says the California State Court of Appeals. The appellate court upheld a lower court's ruling overturning San Francisco's landmark VDT ordinance, which—among other things—mandated breaks from work and adjustable workstations for all computer users . . . Upgrades, Etc. of Ventura, California, has filed for Chapter 11 bankruptcy protection. Pending approval of a reorganization plan (scheduled to have been filed with the court in early October), Upgrades chair Martin Thuna says he'll reopen with a full line of PCs, printers, and upgrade items. In the meantime, he says, Upgrades, Etc. is handling all in-warranty repairs. Call 800/541-1943 (note the new phone number). Another mail-order firm, Smart Micro Technologies, now has Upgrades, Etc.'s old 800 line . . . Pacific Wave Technologies, based in Kihei, Hawaii, is not answering its phones. There's still no word on the status of the company.

By Roberta Furger

MICHELE CLEMENT

Old Equipment Going Unused? Pass It On!

XTs and ATs aren't stupid, they just need to find the right home, says the East-West Foundation's Alex Randall. Any one of the following groups, and countless more, are ready, willing, and able to adopt your orphaned hardware and software.

- **CompuMentor**
  415/512-7784
  Sells donated software to nonprofit groups for a minimal price.
- **Computer Recycling Center**
  408/734-5030
  Distributes donated equipment to California schools and provides ongoing support for hardware and software. Also trains individuals in computer maintenance.
- **Computers and You**
  415/922-7593
  A computer education and training center for disadvantaged children and adults.
- **Detwiler Foundation Inc. Computer for Schools Program**
  619/456-9045
  Solicits corporate donations of PC hardware, which it places in California schools.
- **East-West Education Development Foundation**
  617/542-1234
  Refurbishes equipment and donates it to needy groups in the United States and throughout the world. Accepts donations of single computers or bulk donations from organizations and businesses.
- **National Cristina Foundation**
  800/274-7846
  Brokers donated equipment to 500 partner organizations for use in PC training and rehabilitation programs for disabled and disadvantaged children.
- **Non-Profit Computing Inc.**
  212/759-2368
  Arranges for donation of computers and other telecommunications equipment and software to nonprofit groups.

upgrade to a 486, one of these groups—or perhaps an organization in your own community—can put your old equipment to good use.

"We'll take practically anything," says Cristina Foundation office manager Sally Beers—a sentiment echoed by representatives of most organizations. Many groups will try to place equipment in your community or with a qualifying organization you're particularly interested in supporting. It's not always possible, though, since your donation may not be usable by the group in question. Also, always check with the organizations to make sure they can accept your equipment. Some groups are set up to repair broken hardware, for example, while others don't have the resources to do so.

Donating your outdated equipment will certainly make you feel

Skull

We all have a strong mental impulse to work too hard for too long at our computers and that could lead to injury, so give yourself the warm-ups, breaks and stretches

© 1993 Ergodyne

good, but there's more in it for you than just a warm and fuzzy feeling. With the bottom dropping out on new PC hardware prices, used equipment isn't worth much in the secondary market. By donating your old computers, you'll at least get a tax write-off for the fair market value, plus whatever is left on the depreciation of the equipment. (Some groups, such as the Cristina Foundation, use a PC blue book to determine the value of your donated equipment; others leave it up to you and the IRS to figure out, so ask first.)

Large organizations with dozens or hundreds of users save on storage costs as well. In many cases, branch offices close or equipment is upgraded, and the old stuff just gets stored—the equipment goes unused and you end up with a monthly storage bill. The stored equipment often gets sold as scrap.

Doesn't make much sense, does it?

So dust off that 286 and old dot matrix printer in your closet or cancel your warehouse lease. Don't hoard the old equipment. Give the stuff away!

Shop Talk

The Upgrade That Never Was

Everyone in our small company pitched in to purchase Arago Professional, WordTech's database program, because of its advanced features and the promise of a free copy of the soon-to-be-released Windows version. A few months after purchasing the program, I called WordTech to find out the expected release date of the Windows version. One of the employees told me WordTech had sold Arago to Borland and no longer had anything to do with it. I called Borland, and the person I spoke with suggested I upgrade to dBASE for DOS for $99. We might as well have thrown the $300 we spent on Arago in the garbage.

Theodore Lagadinos, Las Vegas, Nevada

Editor's note: We contacted WordTech to find out if there was any other recourse. And even though it was past WordTech's standard 30-day unconditional guarantee, the company agreed to refund Lagadinos' money. According to a Borland spokesperson, the company plans to incorporate the technology from Arago into its Windows version of dBASE. No future versions of Arago are planned.

No Computer, No Money

In April, I sent a check to V-Com Enterprises in Walnut, California, for a 466DX2-66 multimedia computer, which I was told would be shipped in four to six weeks. Six weeks later, I called to check on the status of my order and was told that PC orders were running about two weeks behind schedule. After calling several more times and being put off by my sales representative, I faxed a cancellation of my order in mid-July. Assuming my refund check was in the mail, I ordered a computer from Gateway. (It was delivered in nine days.) But I never got that check from V-Com. To date, despite many calls demanding my money back and many excuses from V-Com, I am still out $2990.

Floyd Decker, Boise, Idaho

Editor's note: We received two letters from V-Com customers who paid by check and then canceled long-delayed orders ▶

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A larger 170MB hard drive, 4MB RAM, free fax modem and added PCMCIA capabilities give you the extra features you want in your IBM notebook—all at a special price that only Micro Electronics™ can deliver. Small and lightweight, it operates with the Intel 486 SL processor and has the power to run demanding business software. Plus, it comes loaded with popular software and bundled extras at no added cost!

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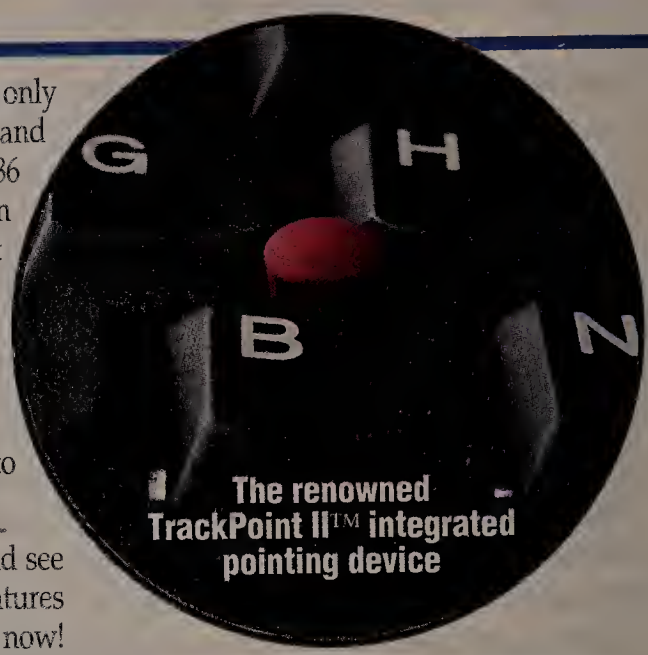
Compare with other notebook models and see how Micro Electronics gives you more features for less. Don't miss this special offer—act now!



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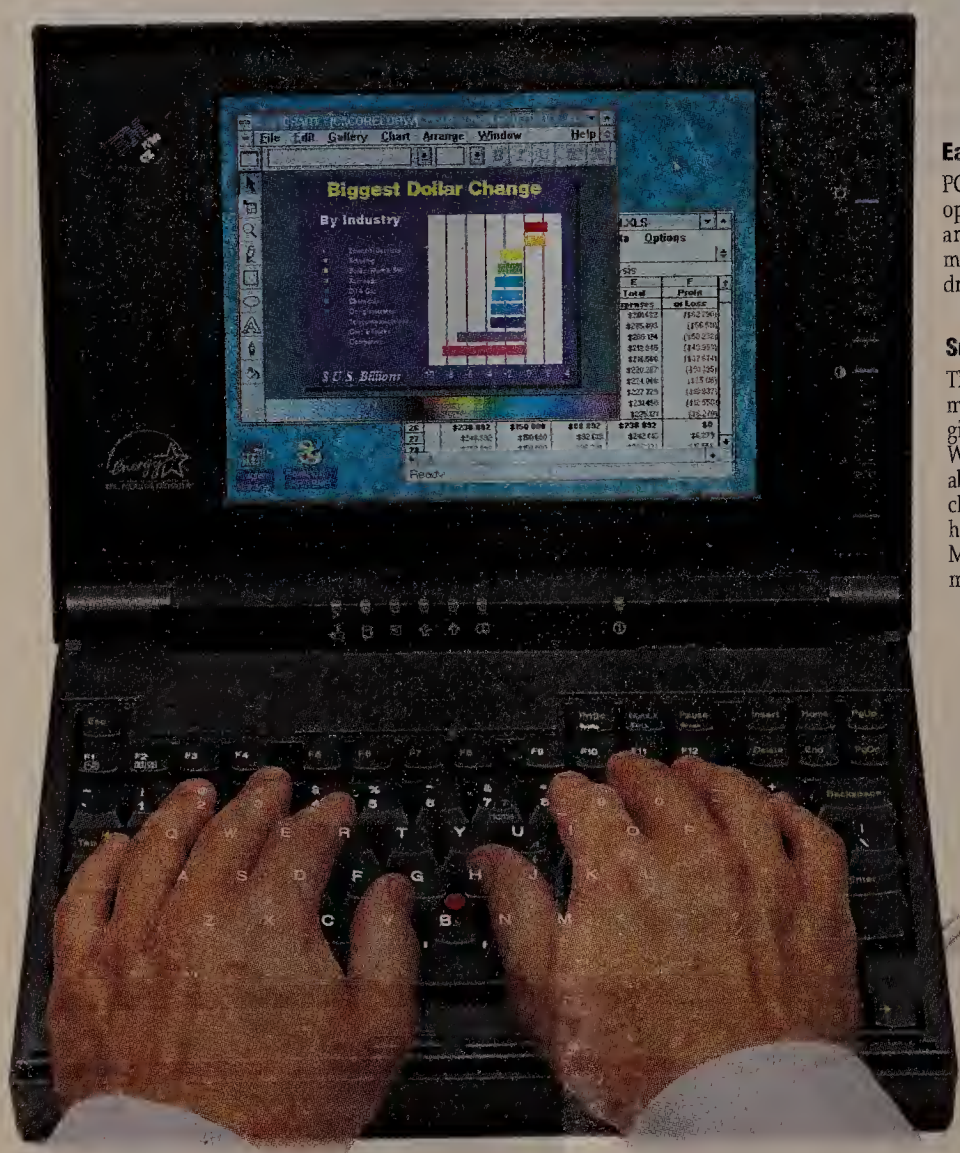

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Receive free, preloaded software with your notebook, worth hundreds of dollars!

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- Microsoft Windows 3.1
- PRODIGY
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- PS/1 Fitness Index and Tutorial.

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Your IBM notebook features an exceptional, full-size 85-key keyboard with the unique TrackPoint II pointing device. Control cursor movements with ease by moving and varying pressure on the eraser-like button.

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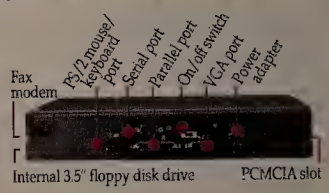

intel inside

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- Color: 5.8 lbs. with battery

Pointing Device
- TrackPoint II

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Windows at your fingertips

"Scoring high in overall value and design, the Micro Electronic's WinBook gives you a lot for your money, including an outstanding integral trackball."

PC MAGAZINE, Portable Computing Issue, August, 1993

The WinBook by Micro Electronics™ gives you the power to run Windows and a unique, ergonomic design to make it easier to use.

It features a built-in, centered trackball which allows you to control cursor movements effortlessly without having to lift a single finger off the keyboard. Full-size keys and a sloping hand rest let you work in total comfort.

The new, upgradable, fully-static design SL enhanced Intel486SX 25MHz chip enables the CPU to operate at a 0MHz low power state. The WinBook's Pico Power Evergreen chipset integrates battery and power management with a proprietary, open loop heat regulator circuit to extend battery life and prevent heat build-up. Plus, we have fine-tuned the WinBook's screen. In monochrome and in dual-scan STN color—you get sharper, clearer images with less cursor loss.

The WinBook was engineered for Micro Electronics, a division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer products. Micro Center has been selling PCs for more than 14 years—longer than IBM or Compaq—with over 736,000 units sold. With over 2.2 million satisfied customers nationwide, we have developed a superior support staff including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

Dual-button trackball centered under the keyboard

WinBook™

WinBook 486 SX Features

Ergonomically engineered

The WinBook's ergonomic features include a sloping hand rest and keyboard, plus a centered dual-button trackball—allowing you to work in total comfort away from your desk.

Clean, sharp color display

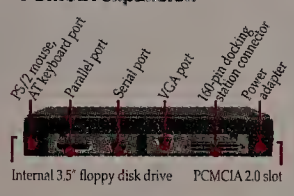
The WinBook's advanced, dual-scan color display gives you 99% shadow-free performance compared to other single-scan passive matrix displays. You get near active matrix quality at a passive matrix price!

NEW! Intel486 SX SL Enhanced intel inside

The 5.4 lb. WinBook, designed by award-winning Palo Alto Design

- Includes a 9600 baud send 4800 baud receive fax/2400 baud modem.
- Fast-acting, LCD screen for less cursor loss.
- Industry-standard PCMCIA 2.0 slot for future expandability.
- 512k video RAM.

Mouse/keyboard, parallel, serial & VGA ports plus PCMCIA expansion



Docking station gives you desktop power

With the available docking station, your WinBook instantly becomes a full-function desktop computer. The two expansion slots and drive bays allow you to add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. It also includes parallel, serial, PS/2 mouse, external keyboard and VGA ports. And it's just $399!

Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.

Monochrome	Dual-Scan Color
$1699	$2399
4MB RAM 200MB HDD	4MB RAM 200MB HDD

- Intel486 SX 25MHz
- DOS & Windows
- Fax modem included!

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- One-year limited warranty on parts and labor.
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Specifications

Size/Weight
- 11" X 8 3/4" X 1 3/4"
- 5.4 lbs. with battery (monochrome)
- 5.9 lbs. with battery (dual-scan color)

Pointing Device
- 16mm Alps dual-action, Microsoft-compatible trackball

Battery
- Up to 3 hours with power management, over 5 hours with auxiliary battery (less 30 minutes for color)
- NiMH (no memory effect)
- 2200 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 1.5-hour recharge

Processor and Memory
- SL enhanced Intel486 SX 25MHz CPU
- 4MB RAM
- Pico Power Evergreen HV chipset
- 8k internal cache

Drives
- One built-in 1.44MB 3.5" floppy drive
- Monochrome: Internal 200MB (16ms) hard drive
- Color: Internal 200MB (16ms) hard drive

Software
- Comes loaded with MS-DOS 6.0 and Microsoft Windows 3.1

Display
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- Serial: 9-pin connector
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Circle 197 on reader service card

BUG WATCH

WordPerfect 6.0 and Random House Webster's Dictionary

Version 1.0 of Random House Webster's Dictionary is incompatible with the graphics mode of WordPerfect 6.0 because it was designed for the text mode of WordPerfect 5.0. WordPerfect is offering a free graphics mode fix through toll-free tech support. The fix is available on disk for $2.50 plus shipping and handling. If you can't wait or don't want to buy the disk, you can invoke the dictionary after switching WordPerfect to text mode.

WordPerfect 6.0 for DOS tech support
800/228-9038

CorelDraw 4.0 for Windows

Corel Corp. has issued a fix for a PostScript printing problem that occurs when users combine sets of open and closed paths (such as a partially closed circle). Under these circumstances, images are distorted when printed or cannot be printed at all. The fix is available on CompuServe and from Corel directly.

Corel also acknowledges a "giant teardrop problem" in CorelDraw 4.0, in which arbitrary line-width changes may occur when users select a collection of ten or more lines in a dialog box, scale the image, and then try to scale the image with handles (outside the dialog box). The company suggests using the dialog box rather than the on-screen handles to scale multiple lines.

Corel Corp.
613/728-1990

—Sarah Klein

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Sarah Klein is an editorial intern for PC World.

but never got their refunds. We called V-Com and were unable to reach the president of the company. According to sales representative Darryl Norman, V-Com was deluged with orders shortly after the company laid off several of its staff. As a result, says Norman, V-Com was unable to keep up with its orders and shipments were delayed. When pressed as to why the company wouldn't refund Decker's money, a second employee (who asked that we not use her name) admitted that V-Com didn't have the cash to send him: "I have to wait until the president, Mr. Fang, gives me the okay to cut a check. There is no money in that account and Mr. Fang hasn't told me I can cut a check for Mr. Decker," the employee told *PC World*.

Decker sought assistance from the Boise police, who contacted the Walnut Police Department (V-Com is located in Walnut). The Walnut police are currently reviewing V-Com's bank records to assess whether V-Com can be charged with theft by deception through the mail (a felony) or if it is simply experiencing financial difficulties.

	COMPANY	ADD1	CITY	TEL	HOURS
1	Macy's	Clifton Center, Wolf Rd.	Albany	555-3865	M,T,W 10-6; Th-Fr 10-9
2	Audio Lab	298 Congress St.	Troy	555-2860	M,T,W 10-6; Th-Fr 10-9
3	Radio Shack	110 Watervliet Ave.	Watervliet	555-1125	M,T,W 10-6; Th-Fr 10-9
4	Lechmere	89 Federal Way	Albany	555-7927	M,T,W 10-6; Th-Fr 10-9
5	Dalton's Audio	310 State Street	Albany	555-4500	M,T,W 10-6; Th-Fr 10-9
6	K-Mart	80 Washington St	Rensselaer	555-5091	M,T,W 10-6; Th-Fr 10-9
7	Hippo's	1500 Central Ave.	Albany	555-5538	M,T,W 10-6; Th-Fr 10-9
8	B.J.'s Wholesale	97 Third St	East Greenbush	555-1519	M,T,W 10-6; Th-Fr 10-9
9	Elmere	Village Plaza, Rt. 146	Schenectady	555-9047	M,T,W 10-6; Th-Fr 10-9
10	Ernest's Stereo	76 O'Brien Way	Loudonville	555-4230	M,T,W 10-6; Th-Fr 10-9
11	Caldor's	1423 Heath St.	Albany	555-1987	M,T,W 10-6; Th-Fr 10-9
12	Coco's	Northern Plaza, Rt. 152	Albany	555-2921	M,T,W 10-6; Th-Fr 10-9
13	Belton Stereos	150 State Street	Troy	555-1473	M,T,W 10-6; Th-Fr 10-9
14	Concord Audio	1999 Railroad Ave.	Albany	555-0200	M,T,W 10-6; Th-Fr 10-9
15	Radio Shack	872 Johnson St	Watervliet	555-0711	M,T,W 10-6; Th-Fr 10-9
16	K-Mart	88 Albany Street	Albany	555-2205	M,T,W 10-6; Th-Fr 10-9
17	Hippo's	45 Wadsworth Circle	Menands	555-6099	M,T,W 10-6; Th-Fr 10-9
18	Sam's Club	870 Central Ave.	Albany	555-3155	M,T,W 10-6; Th-Fr 10-9
19	Audio Lab II	1145 Lawler Ave.	Albany	555-8049	M,T,W 10-6; Th-Fr 10-9
20	Wilton Stereo	189 Central Ave.	Albany	555-4995	M,T,W 10-6; Th-Fr 10-9
21	Caldor's	45 Branch St.	Colonie	555-8606	M,T,W 10-6; Th-Fr 10-9
22	Rettig's Stereo	2764 Consort Rd.	Schenectady	555-8424	M,T,W 10-6; Th-Fr 10-9
23	Homer's	619 Crusty Way	Loudonville	555-1965	M,T,W 10-6; Th-Fr 10-9

Making sense of the amount of data flowing into your company is like trying to drink from a fire hose. If the pressure doesn't overwhelm you, the volume will.

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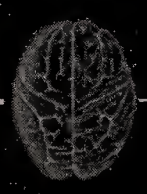
Think.



Detective Dave Barker, of the Walnut Police Department, says V-Com's failure to refund Decker's money is the result of poor financing, not fraud. "They are trying to do what they can," says Barker. "Basically this is a civil matter, because I have no evidence to prove that it's any kind of scam." According to Barker, Fang is out of the country and the two current V-Com employees "have nothing to do." He adds, "They haven't taken orders for a couple of weeks now."

As we went to press, V-Com had stopped answering its phone. There's no word on whether Decker will ever get his money back. The moral of the story? Pay with a credit card.

Technical Support?

I purchased a computer from Maximus Computers in Monrovia, California. When the system arrived, it wouldn't boot up. I called technical support, but I couldn't communicate with anyone because they barely spoke English. I had a dead system, though, and needed their help. So I persisted. They wrote down my questions and promised to call me back. Repeatedly. But no one ever did. Finally, in frustration, I sent a fax saying that I wanted to return my computer and asking for a return merchandise authorization (RMA) number. This time I got a call back. It was my original salesman, who promised to help. I explained my problem, and he agreed to send me another system and gave me an RMA number. A few weeks later, I got my new system.

It was visibly damaged when I took it out of the box, but it worked, so I kept it. A few weeks later, I installed new memory and started to get parity errors. Then the new hard drive I bought (Maximus assured me it was compatible) wouldn't work with it. Finally, the monitor failed.

I shipped it back to the company once again. Maximus repaired it and sent it back, but I still get memory parity errors and the floppy drives are now malfunctioning.

Glenn Travis, Richmond

Editor's note: We called Maximus to discuss Travis's problems, and although we spoke with the company president, we were no more successful than Travis at resolving his problems. Since we made no headway with Maximus directly, we called the local Better Business Bureau (BBB) to see if it had received similar complaints about the company. The report was not encouraging. The BBB gave Maximus an unsatisfactory rating because of a large number of unresolved complaints against it. Complaints to the BBB against the company include allegations of inferior quality or defective products, misrepresentation during sales, and refusal to issue refunds as promised.

Travis told us he is still willing to work with Maximus to get his system up and running. "But when I call them, they yell to each other about how ignorant I am and hang up on me. One day, they hung up on me five times in a row, then they just stopped answering the phone."

Travis added that, although the company advertises an 800 number for technical support, when he calls that number he's given a toll number to call. "I have the computer in a local shop and I'll have to pay for the ▶

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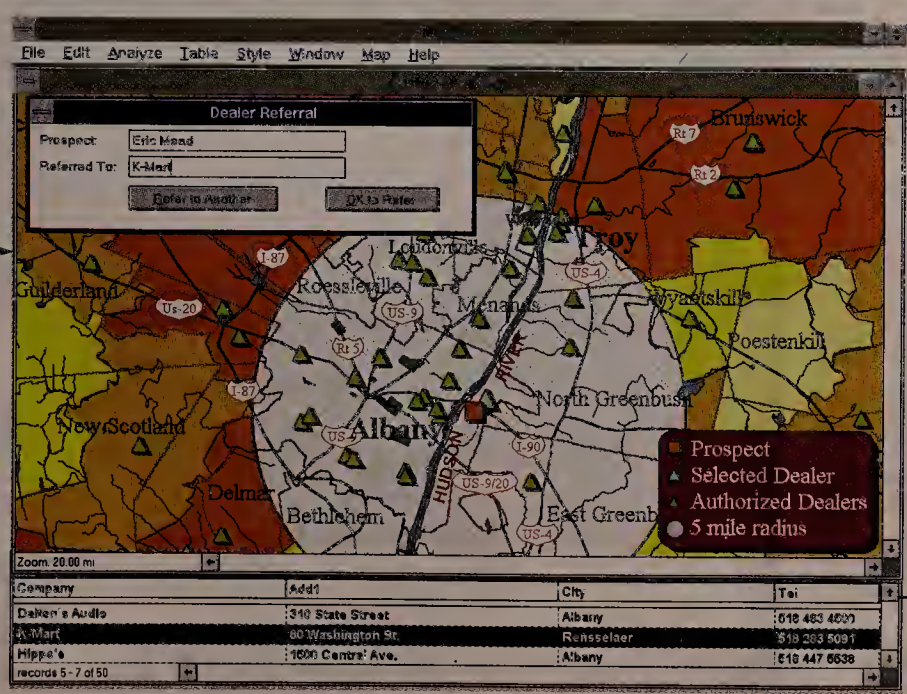
Visually.



By correlating information by location, MapInfo lets you think visually. And when you do, patterns, trends and relationships in customer services, sales, marketing and operations begin to emerge. Clear pictures of opportunities you've been missing appear right on the screen.

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The Standard in Desktop Mapping

repairs. The next time, I'll buy locally," says Travis.

We have received only this one letter of complaint against Maximus, but given its unwillingness to help Travis and refusal to speak to us, Maximus certainly doesn't get a stamp of approval from *PC World*.

Blackmailed to Upgrade?

I have been using Backup in Central Point's PC Tools for several years. At times, this backup has failed. Although the clock continues to run and no error message is displayed, the backup simply quits. This happened to me recently when I was on disk number 39, and I decided to call the company's technical support. And was I ever in for a surprise.

After being on hold—long distance—for 15 minutes, I was told I would be charged $14 for an answer, since I had not yet upgraded to the current version of the product. I explained that I was planning to upgrade when I bought my new computer in a month. Then they told me they would put my call through but, if I needed more support, I should upgrade. I was put on hold for another 10 minutes before I finally gave up.

Not only do I consider this support unacceptable, I resent being blackmailed into upgrading. Not all customers can afford—nor do they really need—to upgrade every time Central Point adds another new tidbit to its software.

I guarantee that when I buy a new computer in a month, the backup software on it will *not* be PC Tools.

Mary Sieger, Pittsburgh

Editor's note: We contacted Central Point, which helped Sieger resolve her problem and also gave her the most recent copy of PC Tools. As for the $14 charge to answer her question, Teresa Warsop, manager for U.S. customer operations, told us: "There's a growing trend for software publishers such as Microsoft, Lotus, Aldus, XTree, and Central Point to charge for some product support services. Central Point charges for phone support for previous versions of our products."

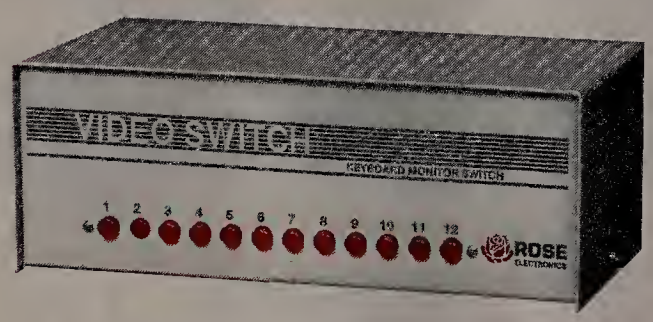
There are other technical support options that are free, however. Central Point has a BBS (503/690-6650 for 2400-bps access and 503/690-4777 for 9600-bps), forums on America Online and CompuServe, a toll-free voice-response system that answers commonly asked technical questions (803/690-8090), and a fax-back system (800/847-8766). If you still can't find the answer you need, you can send a letter or a fax to the technical support department (503/690-7133).

As for Sieger's charge that she was blackmailed into upgrading, Warsop said: "We inform customers that upgrades are available if they call for support on previous versions. We don't recommend that a customer upgrade if the earlier product is meeting their needs."

Shop Talk *is researched and written by* PC World *assistant editor Christina Wood. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 10 for contact information.* ■

Your Choice of Keyboard Monitor Switches

Access multiple computers with a single keyboard and monitor to cut equipment costs, save valuable space, and end clutter



Manually controlled unit

- Simple pushbutton operation for quick selection
- Four, eight, or twelve ports per unit
- Daisy-chaining connects unlimited number of CPUs
- Compatible with EGA, VGA, Macintosh, Sun, and others
- Optional keyboard booting for 286, 386, and 486
- Optional RS232 or PS/2 mouse interface
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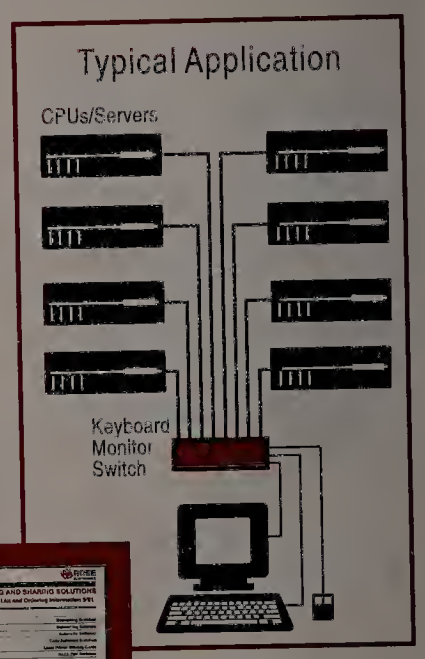
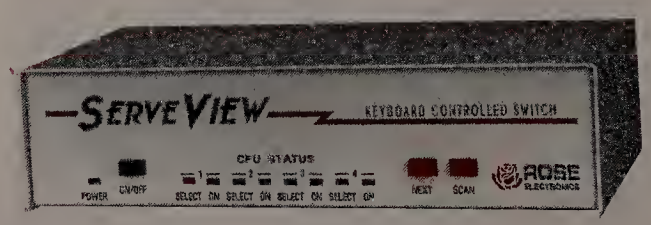
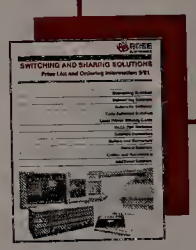
- Rack mount, matrix, and customized units available



- Switch by keystroke, from front panel, or RS232 port
- Two or four ports per unit
- Cascade units to support up to 255 CPUs
- Supports monochrome, EGA, and VGA
- Includes keyboard booting for 286, 386, and 486
- Includes RS232 and PS/2 mouse interface
- LEDs display selected CPU and CPU power-on
- Scan function switches among CPUs automatically



Keyboard controlled unit



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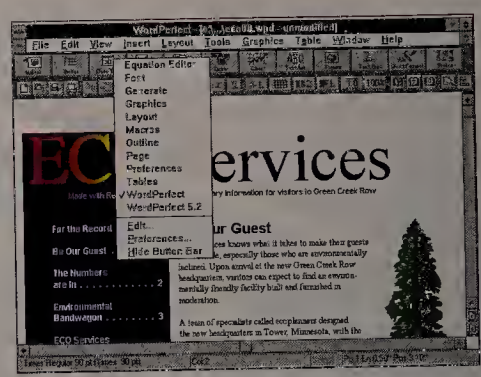

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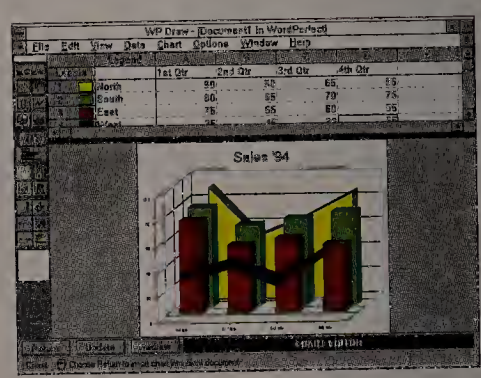

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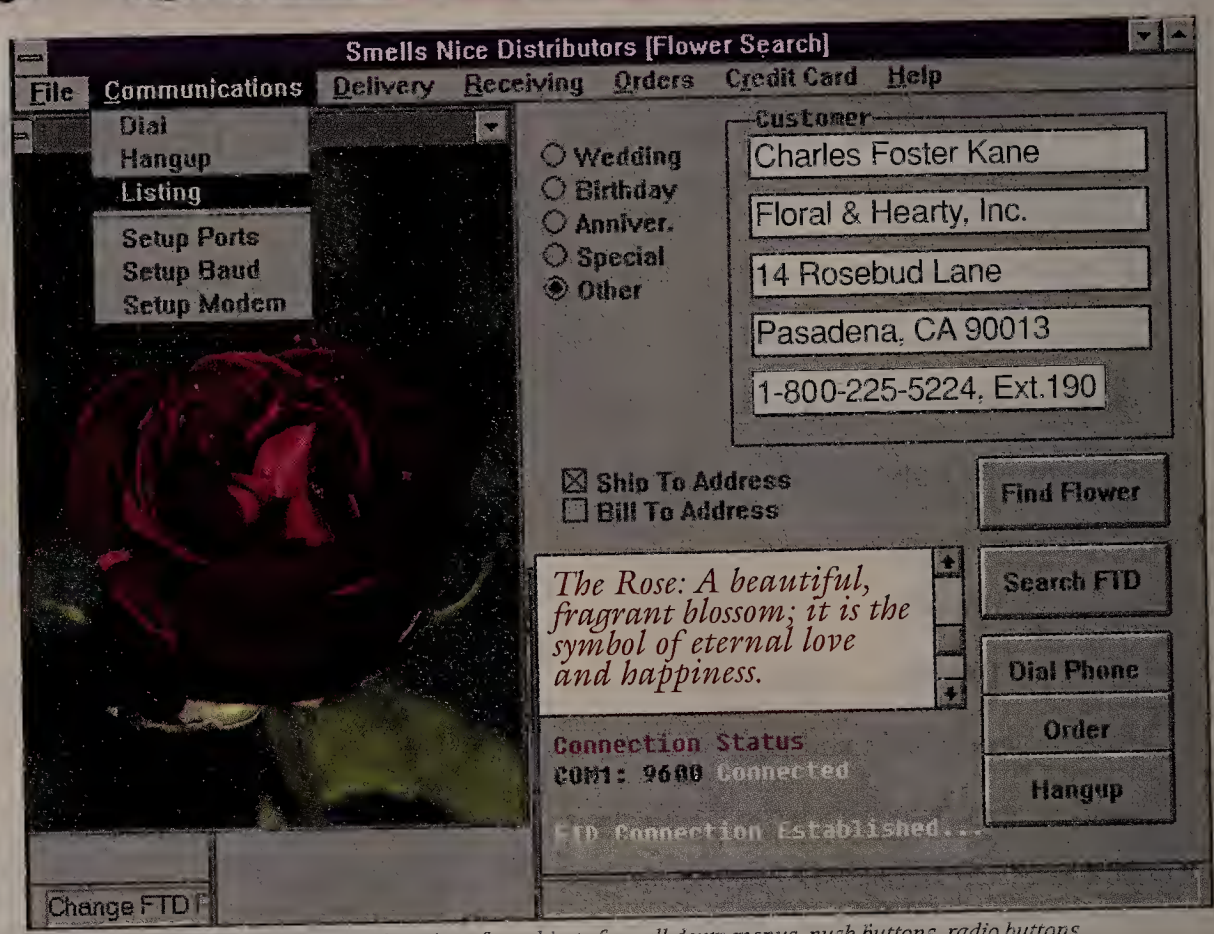
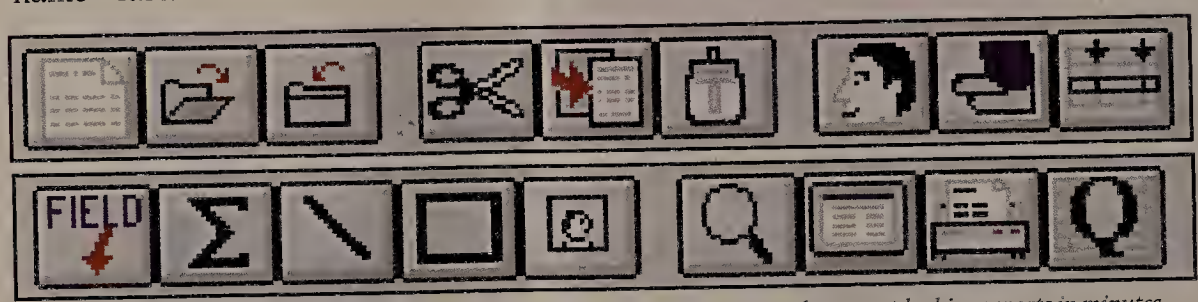


CA-dBFast includes Windows interface objects for pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes, bit-mapped graphics and more.

debugger that's so advanced it lets you watch your source code execute at run time – even Single Step through execution.



CA-dBFast's report writer, CA-RET, lets you mix text, graphics and data to produce great-looking reports in minutes.

The Visual Application Designer (VAD) makes creating pull-down menus, push buttons, radio buttons, check boxes, scrolling list boxes and other Windows objects as easy as "point and click" or "drag and drop." The VAD generates the required source code, saving you hours of complex programming. You also get a debugger that's so advanced it lets you watch your source code execute at run time – even Single Step through execution.

CA-dBFast 2.0 also includes CA-RET – an outstanding Windows-based report writer that lets you mix text, graphics and data on the same report in a full WYSIWYG environment.

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Circle 26 on reader service card

The Wizard of Odds

Have you ever needed to retrieve files from your office when you were working at home or on the road? Like Dorothy in *The Wizard of Oz*, most of us don't realize that we can accomplish nearly miraculous feats using tools we may already have. This month Leo MacPhee, a lawyer with Khattar and Khattar in Sydney, Nova Scotia, describes how using his 286, some off-the-shelf software, and a fax-modem helped overcome problems of time and distance—and saved the day for his client. —*Ed.*

Going the Distance

In just about every business, there are times when critical files are in one place, and the people who need them are in another. In my firm, lawyers and support staff often have to exchange case briefs and other documents via overnight mail when cases we're handling are being heard by the appellate court in Halifax, 260 miles away.

My firm has been using computers for years, but our equipment isn't state of the art. We run WordPerfect 5.1 and other DOS-based applications on our IBM 386-33 Novell NetWare server, accessing these programs through old desktop IBM XTs. Most staff members don't use the computers for anything much more complicated than word processing case briefs or communicating via our Pegasus Mail E-mail system.

When I am working on a project and need a quiet place to concentrate, I work at home. With a modem and some communications packages, I can transfer messages and files electronically between various destinations. On one memorable occasion, the distance between my home, the office, and the appellate court could have caused my firm to lose a client's case. But because I had solved the problem of accessing files remotely, we were able to overcome the limits of time and space.

Time Crunch

Last March my associate, Theresa Forgeron, was working frantically on a divorce case that she would be arguing the next day in Halifax. At 4:15 p.m., the Registrar of Appeals called to tell her that a technicality in the case presented a risk for our client, and that we should be prepared to argue against it.

Unfortunately, all the law libraries closed at 4:30, and Theresa was due to fly out at 6:30 p.m. She had no time to prepare a new argument. She called me at my home office, hoping that I might have some ideas for arguing against the technicality. I didn't.

I told Theresa that I would research the issue and call her at her hotel the next day with whatever I could come up with. Since I was already familiar with remote communications software, I wasn't daunted at the prospect of getting a final document into her hands before she went to court the next day.

Close Up and Far Away

By 9 p.m., I'd finished my work and turned my attention to solving Theresa's problem. First I needed the case files, but they were at the office—a 25-minute drive away.

I fired up my computer and used Norton-Lambert's Close-Up, a dedicated remote access program that allows you to operate a distant computer through the phone lines, to access the firm's file server. Once the connection was made, it was just like working from the computer on my desk at the office. I located the brief I was looking for in the directory on the file server. Then I used Close-Up to download the file by issuing the Transfer/Receive command.

Leo MacPhee, an atttorney at Khattar and Khattar in Sydney, Nova Scotia

I disconnected from the office computer and then opened the document in WordPerfect 5.1 on my home computer. Now I could use it as a template for the new brief, complete with standard legal formatting. The argument section of the new brief required some additional case reference information. Armed with a modem, I wasn't limited to the library's hours for research. It was time to do an online search.

Working with Datastorm's Procomm communications software, I connected to Datapac, a service that lets me use high-quality data phone lines at a lower rate than for a standard telephone call. Datapac, in turn, connected me to a legal resource database service located in Kingston, Ontario—Q L Systems' Quicklaw—where I could find the complete documentation on just about any case in Canada.

To find possible precedents or other cases that might have some bearing on our case, I used some text search tools

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the database service provides. I typed terms such as "family law & appeal & procedure" as my search parameters. Since these searches are very expensive (up to $150 per hour), I chose carefully those words that would yield the cases most pertinent to the problem. Within a few minutes, the database returned five cases. It didn't take long before I found the precedents I was looking for. To download the relevant cases to my computer, I simply turned on Procomm's log feature, which saved the results of my search to my hard drive.

Best Foot Forward

Once I had the information I needed and had edited the argument section, I imported the precedent files into my new brief. I used Bitstream's FaceLift 2.0 for WordPerfect to change to a classy-looking proportional font. After editing the document one last time, I saved the final draft on my hard disk, transferred a copy to the office using Close-Up, and went to bed at 1 a.m.

The next morning, I faxed a copy of the document to Theresa at her hotel. At 10 a.m., she phoned my home and suggested some minor changes. By 11 a.m., the final document was ready. By noon, Theresa was armed with a new, complete brief for her 2 p.m. court appointment.

Winning the Day

The judges reviewed our brief and concluded that our argument countered the technicality. The lawyer on the opposing side had left his office the afternoon prior to the hearing to drive to Halifax, and he was not aware of the problem until he phoned for his messages the next morning, too late for action. Without rebuttal from his side, the court ruled in our client's favor.

This experience taught me that it's not the technology you have, but how you use it, that makes the difference. It doesn't take any special skill or even fancy hardware and software to get a competitive edge. My old 286 has always served me well, and with the help of some off-the-shelf software and a little ingenuity, I was able to beat the odds.

Edited by Bronwyn Fryer

If you use PCs to manage people and other resources in a business environment, we want to hear from you. See page 10 for contact information.

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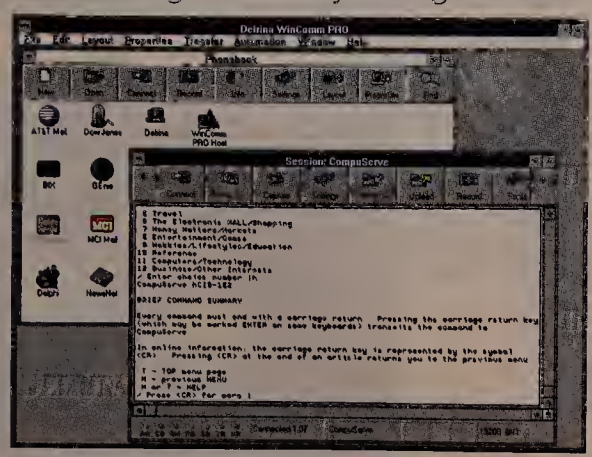

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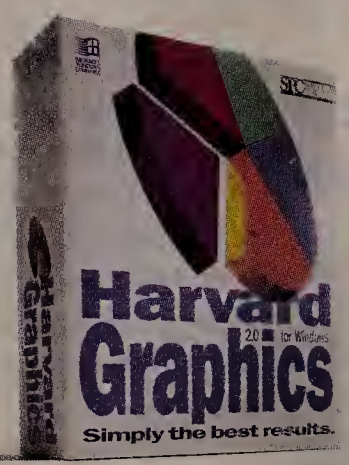
It's about moving people



Harvard Graphics™ is about to change the world of presentations. Again. New Harvard Graphics 2.0 for Windows™ is the first presentation software focused on what comes after the meeting, not just what comes before.

Of course Harvard Graphics 2.0 for Windows is easy to use. In fact, it's easier to learn, easier to use and has more powerful features than any other presentation product you care to compare it to.

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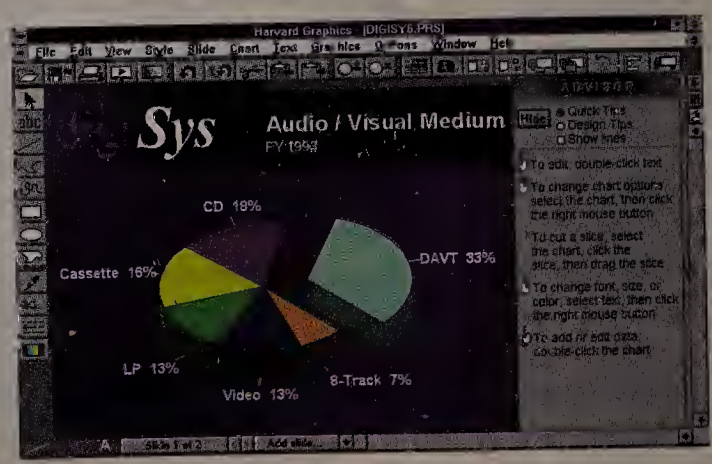
With Harvard Graphics 2.0 for Windows, you'll get the results you want from every meeting, discussion, proposal and presentation.

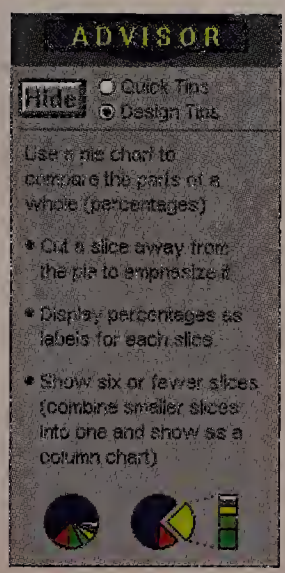
The Harvard Graphics Advisor's Quick Tips (the vertical bar on the right) puts impact-increasing, action-inducing presentation tools within easy reach of your mouse. There's also a Five-Minute Coach available to speed you through the basics of creating better presentations.



software that's about and changing charts.

and changing minds.

To help you get the best results, we've put a presentation expert inside the program. It's called The Harvard Graphics Advisor.™ The Advisor is an on-screen advice system to help make your bullet points more targeted, your pie charts more tasteful and your bar graphs more impactful. For more help, you can even call our Advisor hotline, where graphics experts are standing by.



The Advisor's Design Tips make it easy to give your presentations that fit-and-finish look, even if you aren't a graphic designer.

In no time, you'll have output that works harder for you, without having to work harder to get it.

We'll also help you sell your ideas in the meeting, with speaker notes, on-screen highlighting and stunning special effects. We can even help you conduct meetings over your network, with our exclusive Conferencing feature.

In short, Harvard Graphics 2.0 for Windows represents a new standard in presentation software. One that goes beyond ease of use to something far more important: results.

See your local reseller. Or call SPC now at ***1-800-336-8360, Oper. 962*** to order at our special upgrade price of $89 or to request a free demonstration disk. Also available on CD-ROM.

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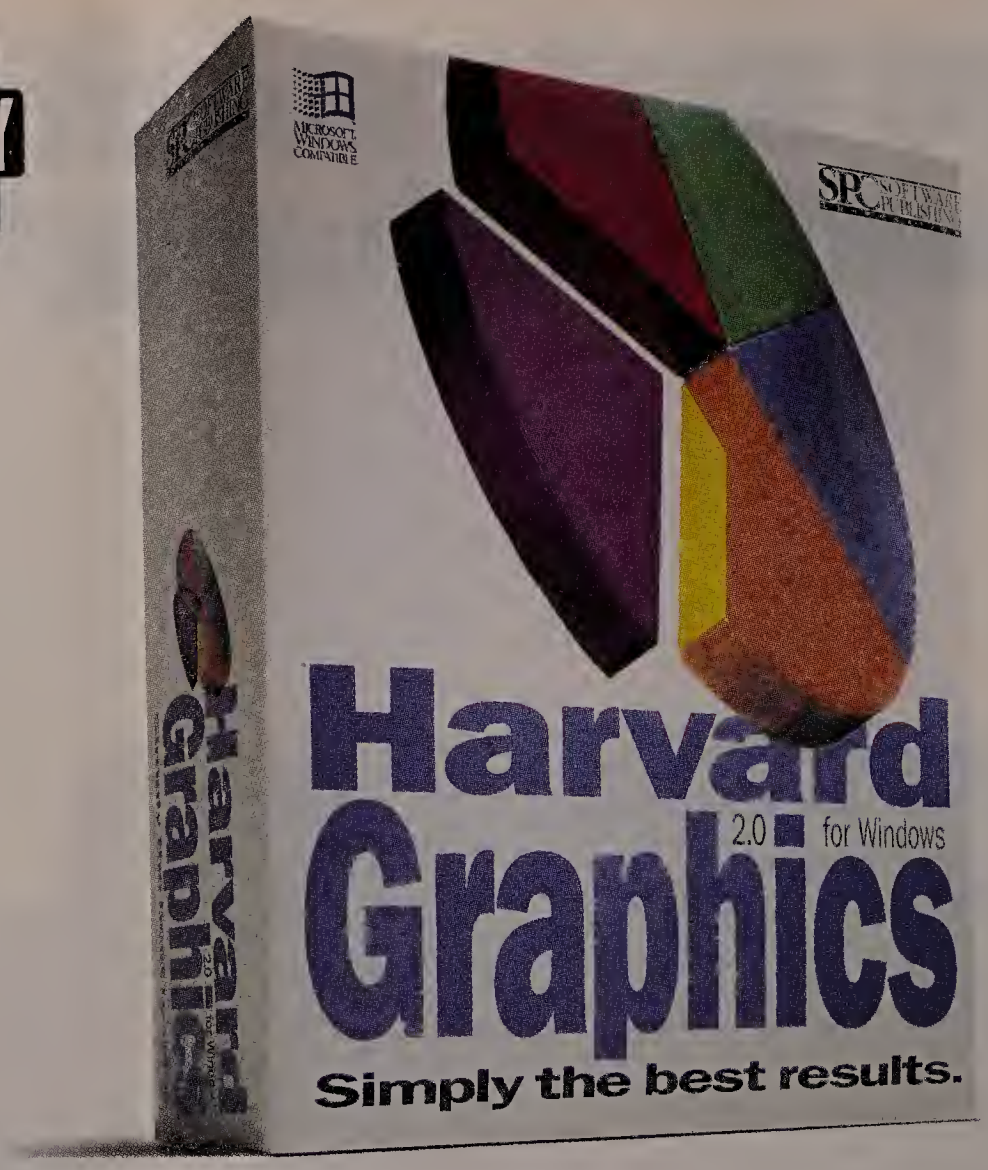

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With Harvard Graphics 2.0 for Windows, every hour you spend creating presentations will be shorter. And every idea you present will be more compelling.

Simply put, Harvard Graphics 2.0 for Windows represents a new standard in presentations. With more than 100 new enhancements, it's easier to learn, easier to use and has more results-oriented features than any other presentation software you are currently using...even Harvard Graphics.

Here's a sample of what's new in Harvard Graphics 2.0 for Windows.

New ease-of-use features.

Advisor Quick Tips-helps you create and enhance your presentations quickly.

Quick Looks-shows options to you graphically, before you implement them.

Customizable Icon Bar-makes your most used features easier to get to.

New results-oriented features.

Advisor Design Tips-expert assistance to help you create high-impact charts.

Harvard F/X™-lets you add attention-getting text and drawing effects to enhance your message.

Conferencing-lets you convene meetings over existing networks for as many as 64 participants.

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Not the Year of Ease of Use

Don't you just hate those holiday columns where some dubious intellect proclaims the next annum as the year of this or that? I certainly do. Right now a columnist in some PC magazine is doubtless conferring "year" status on personal digital assistants, or the PowerPC.

Making such predictions is rightfully a function of the United Nations, not the PC industry. At least when the UN acts we get a few swell postage stamps. The PC business, unable to make stamps that say anything more important than "Intel Inside," lacks such pomp and circumstance. We should stop proclaiming years once and for all.

So before someone gets a bright idea, I'd like to explain why 1994 will *not* be the Year of Ease of Use, despite the best efforts of Microsoft and others.

Bill Gates seems to have finally decided that now is the time for solving hardware problems that have haunted Intel-based PCs since their inception.

With the forthcoming Windows 4.0 operating system (code-named Chicago) and new plug-and-play self-configuring hardware, Windows will finally be able to credibly challenge the Apple Macintosh for ease-of-use honors. Plug-and-play peripherals are already beginning to appear, with Compaq their chief systems proponent. But it will require Chicago and new applications to take full advantage of add-on cards, networks, printers, multimedia, and other devices and make them work right the first time you plug them in.

This is a complex project, and I don't think the Chicago and plug-and-play combo will be available until the end of 1994, perhaps later. But just the creeping awareness that Windows may finally work right is giving Apple fits.

But if Microsoft is going to get in Apple's face, Apple will respond with a full-court press to enter the Windows business. Apple will do this with printers and other peripherals, a CD ROM–based software distribution and systems software and applications. Apple seems confident that it, too, can make Windows easier to use.

How Suite It Is

Also during 1994 I am expecting to see WordPerfect do some very interesting applications work on the E-mail and groupware fronts. Its new database and personal information manager, due to ship sometime in 1994, has tremendous capabilities that the first generation of the application only hints at. 1994 should also see WordPerfect competing head-to-head with Lotus Notes in some areas, without making users learn a programming environment.

Suites are becoming the main channel for getting applications onto desktops, and that trend should only increase. Best of breed is no longer enough—today's applications also have to know how to work together.

Thanks to Object Linking and Embedding (OLE 2.0), suites, works, and products such as Microsoft Office promise to make it much easier to share information between applications. This is the beginning of the "compound document," which will blur the lines between traditional applications.

Borland still faces challenges as we flip the calendar into 1994. Its work group strategy, built around Object Exchange, looks promising but has a long way to go in popularizing a publish-and-subscribe model of sharing information. I hope Borland will help kick-start this market by making it easy for people with prepackaged group applications and features to create commonly used objects and share them over E-mail or local area networks.

You might think that all of these ease-of-use features represent a trend. You might even say that 1994 will be the Year of Ease of Use.

You just might do something like that. But I won't.

Contributing Editor David Coursey can be reached on PC World Online (see page 10 for more information).

LOOKING AHEAD

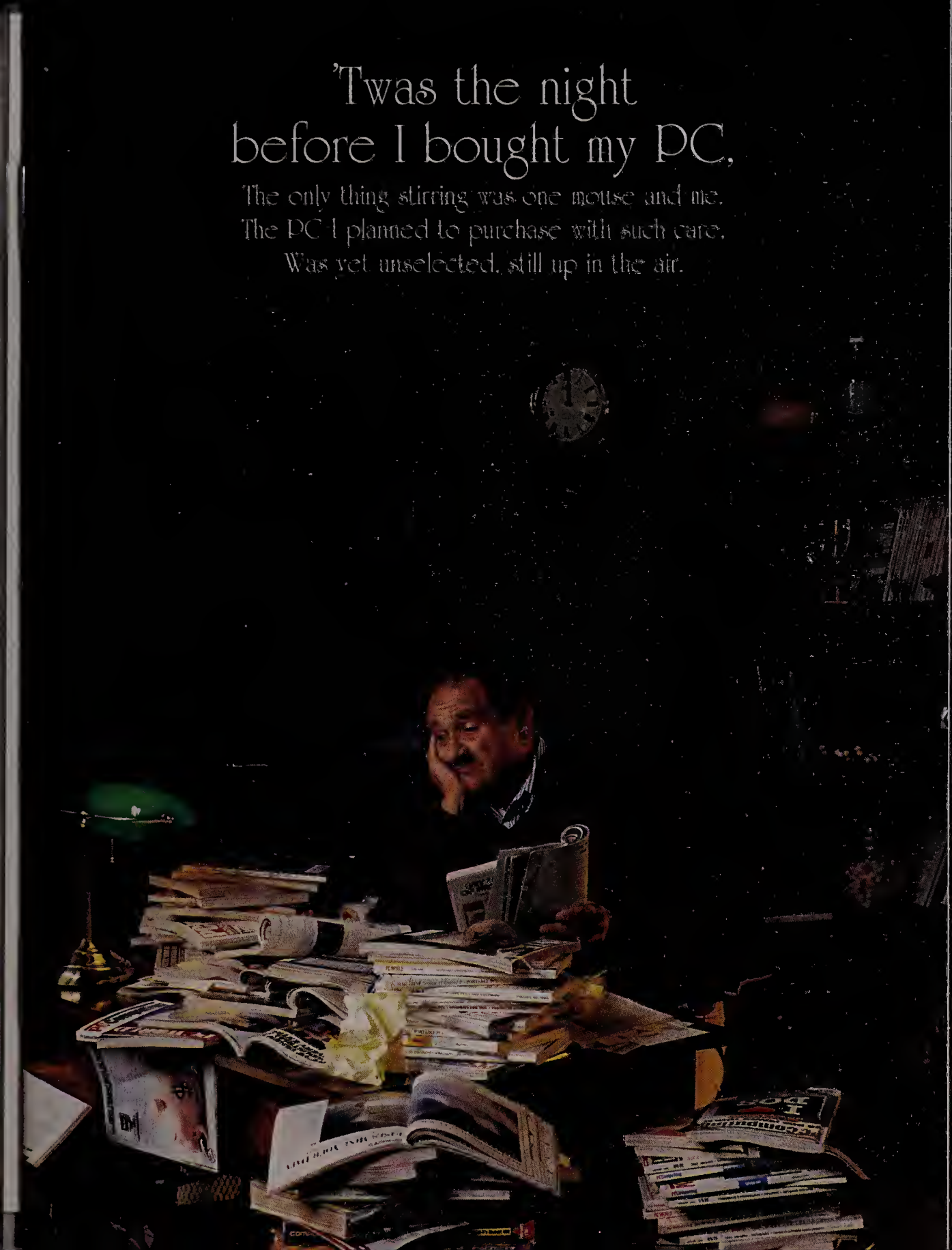
If you can avoid buying a personal digital assistant this holiday season, hold off: Prices will go down afterward as supplies improve and competition increases . . . My most-wanted techie-nerd gift (I've given up for now on a small wireless E-mail system): A PCMCIA-based Global Positioning System hardware-software combo, like the one Socket sells, so I'll never be lost and will always have accurate time. I'd also like a nice beach to send an AT&T fax from, bundled with a water and UV-proof EO communicator . . . Ecco was the personal information manager that defined PIMs in 1993, but I wouldn't be surprised to see the ball handed off in 1994, the technology is moving soooo quickly. PackRat was yesterday's model, Ecco is today's, but who owns tomorrow? The future is for those who make it easy to manage all your personal data and build relationships. Watch for the "O" word—this is where objects mean something . . . I'm still waiting for a really good expense reporting program for road warriors, but I may have put a bug in Scott Cook's ear. He runs Intuit.

By David Coursey

MICHELE CLEMENT

'Twas the night before I bought my PC,

The only thing stirring was one mouse and me.
The PC I planned to purchase with such care,
Was yet unselected, still up in the air.



This business of buying the perfect PC
Was more difficult than I thought it would be.
While visions of failure loomed dark in my head,
My eyelids grew heavy as if they were lead.
I may have been dreaming, but how can I tell?
My memory recorded what happened so well.
Then out on the lawn there arose such a clatter,
I sprang from my desk to see what was the matter.
I saw the strange craft and I let out some "Wows,"
It's not often you see a red sleigh drawn by cows.
For a second I swore that my eyes played a trick,
The driver was Santa Cow, not old St. Nick!
She brought with her toys for broadening minds,
Gateway 2000™ PCs of all kinds.
I remembered that name — "Gateway values," I read,
"Are the best in the industry," editors said.
"Gateway's prices, quality, and service," they wrote,
"Are udderly wonderful. They get our vote."

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HANDBOOK 486

Santa Cow didn't speak, but went straight to her work,
Pulling PCs like magic from her bag with a jerk.
Then, what to my wondering eyes should appear,
But a miniature PC called the HandBook, I hear.
With VGA screen and performance so quick,
I knew at a glance 'twas a 486.
So how could they make a
computer this small?
The whole package weighs less
than three pounds in all!
This little gem would be perfect
for me,
Working hither and yon as I'm oft apt to be.
The HandBook would be a most marvelous gift,
But there are more choices to ponder and sift.

HandBook® 486

- Revolutionary size
- Intel® SL-Enhanced 486 CPU
- Backlit VGA screen
- Great power management
- Touch-type keyboard
- Integrated pointing device
- Prices start at just **$1,495!**

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At once I set eyes on another delight,
Its screen was a bouquet of colors so bright.
'Twas the 486 ColorBook under the tree,
Same price as mono from another company.
Performance and color at such a good price,
Is there something here that will
barely suffice?
It's light and still small, has a
built-in trackball,
With the ColorBook you really
can have it all!
I started to see that with all
Gateway's wares,
Although it sounds corny, there somebody cares!
You get honest value for your hard-earned buck,
Compared to them I find the other brands ...
Well, they're just not as good.

ColorBook™

- Brilliant color at mono price
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Santa Cow was still busy unwrapping PCs,
The next one she opened was sure to appease
A person who's searching for power for less,
Mini desktops from Gateway are simply the best.
These systems' performance is tops in their class,
Just study the benchmarks,
these mini's kick ____.
A whole lotta MIPS here for
not that much money,
This deal would be easy to sell
to my honey.
With local bus also the video
is fleet,
Add software to boot and the system's complete.
When it's said that small packages hold the best things,
It refers to the mini's that Santa Cow brings!

Mini Desktop Systems

- Outstanding price/performance
- Local bus video
- Small footprint case
- Upgradeable & expandable
- Large, fast hard drive
- Energy Star "Green" PC
- Prices start at only **$1,275!**

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GATEWAY2000 4DX2-66V

Behold! What's this? More systems to view?
Santa Cow showed another with a trumpeting moo.
I sneaked a close look out from under a table,
4DX2-66V was the label.
I recognized this "Big Kahuna"
machine,
The one that the editors said
would just scream.
It won all the honors, near
countless awards,
These VESA PCs hold most
proud motherboards.
I ruled out this kind of performance for us,
Too costly, I reasoned, for VESA local bus.
But look at that price, I was certainly wrong,
With Gateway I can have that for which I long.

VESA® Systems

- Exciting video performance
- Non-proprietary VESA local bus
- Compact but roomy desktop case
- Upgradeable & expandable
- Large, fast hard drive
- Energy Star "Green" PC
- Prices start at just **$1,495!**

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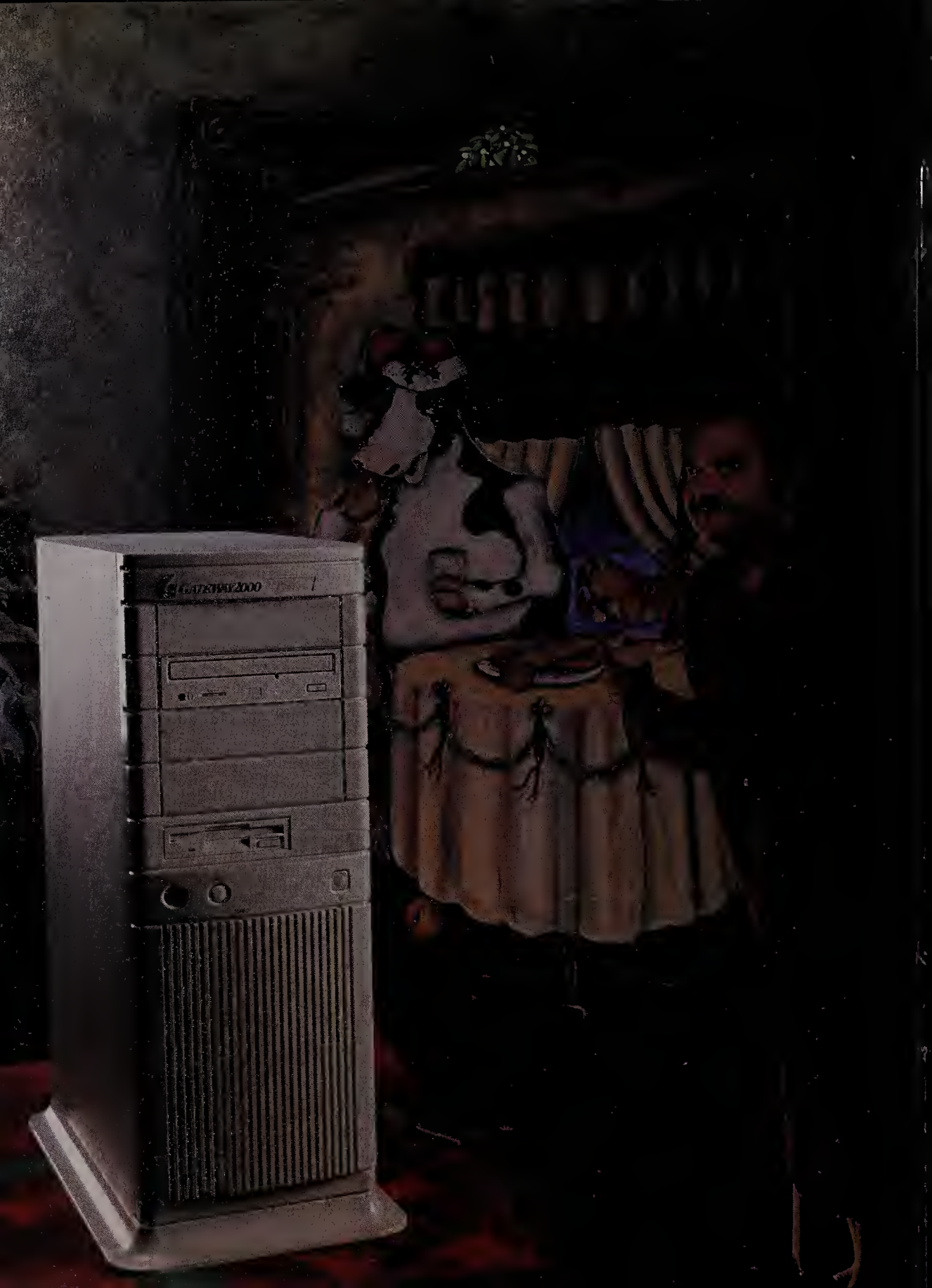
GATEWAY 2000

"Oh no! Santa's gone!" I heard someone exclaim,
'Twas me, I discovered, no other to blame.
Then I saw where she was, in the kitchen she sat,
Santa Cow having cookies and milk with the cat.
In the doorway I found one
more fabulous thing,
In all of PC-dom, the system
that's king.
A Pentium tower with PCI bus,
This system is certainly worth all
the fuss.
With oodles of RAM and a big
dose of cache,
The P5-60 is the way to be brash.
I've so many choices, now what have I missed?
How 'bout a Gateway for each on my list!

Pentium™ Systems

- Intel®'s latest 64-bit CPU
- Outstanding video performance
- Extremely fast PCI local bus
- Expandable tower case
- Giant, fast hard drive
- Double-speed CD-ROM
- Prices start at only **$2,995!**

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pentium PROCESSOR

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Like icing on top of a
wonderful cake,
The Cow filled the stockings with
goodies that make
A PC productive and more
fun to use,
Peripherals keep you from
singing the blues.
Of course multimedia is all
the rage,
You've plenty to choose from to
move to that stage.
With sound cards and speakers
and fast CD-ROM,
There's stuff here to please any
Harry, Dick or Tom.

Multimedia

Multimedia Upgrade Kit

Kit includes: Gateway 2000™ 16-bit CD-quality sound card, Sound Blaster-™compatible; double-speed CD-ROM drive compatible with music CDs, multisession photo CDs and CD-ROM titles; two Labtec® speakers that attach to your PC monitor; Microsoft® Encarta (*worth $249 by itself*), system CD with Microsoft Multimedia Pack.™ **$299**

For system configurations that include a CD-ROM drive: **$132**

Altec Lansing Speakers

Get superior stereo sound with these top-rated Altec Lansing ACS-300 speakers with separately powered subwoofer. **$219**

Sound Kit

Sound Blaster 16 Advanced Signal Processing sound card and two Labtec speakers. **$195**

Communications

TelePath™ II Fax/Modem
Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. Package includes Crosstalk™ for Windows, WinFax™ Lite, Qmodem and a CompuServe® trial membership. **$159**

Cardinal® 2400 Fax/Modem
Internal fax/modem, 2,400bps modem, V.22bis, with 9,600bps fax capability. Package includes Qmodem and WinFax Lite. **$49**

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A 16-bit Ethernet adapter from one of the world leaders in network adapters. **$105** Twisted Pair or BNC Kit (BNC Kit includes cable, connector, terminator and card)

Ethernet Adapter from 3Com®
Manufactured by 3Com for Gateway. Features parallel tasking architecture with a high level of integration. **$105** Twisted Pair. **$125** BNC Kit (includes cable, connector, terminator and card)

Colorado Memory Systems TBU
250MB internal automatic tape backup unit copies up to 9.5MB per minute with high-speed data compression. Comes with easy-to-use Windows and DOS software, one tape and cable. **$159**

Monitors

CrystalScan® 17-Inch Monitor
Non-interlaced color monitor, .26mm dot pitch. If your system comes with a 14-inch monitor, you can upgrade to this monitor for **$600**; from a 15-inch monitor, **$520**. (Prices good only for upgrades at the time of system purchase.)

Printers

Panasonic Color-Capable Printer
Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager.® KX-P2123 Printer **$259**; Color Option **$50**

Epson® Stylus 800 Ink Jet Printer
Great laser quality at an even greater value. Measuring only 17 inches by 10.5 inches, the Stylus 800 has seven different typefaces and prints an extra-quiet 150 characters per second at 360dpi. Parallel cable included. **$289**

Epson ActionLaser 1500 Laser Printer
The ActionLaser delivers professional-quality printouts with crisp, sharp images, black blacks and smooth, "jag-free" lines. It also features a fast six-page per minute print speed, 14 resident fonts, 300 x 300dpi, and 1MB memory expandable to 5MB. Parallel cable included. **$669**

TI MicroLaser™ Pro 600
This Texas Instruments laser printer redefines value in high-performance printing with 6MB RAM standard, a fast eight pages per minute print rate, 500-sheet capacity and true 600dpi quality.

With 23 PostScript® Fonts: **$1,449**

With 65 PostScript Fonts: **$1,629**

The peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

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The software was Santa Cow's
pièce de résistance,
With titles from Gateway I'd
placate all wants.
Each Gateway PC comes with
software installed,
More options than anywhere
else that I called.

Application Software

If a system comes with "choice of application software," choose one of the following packages:

Microsoft®Excel for Windows™
Microsoft Word for Windows™
Microsoft Word and Bookshelf'92,®
CD-ROM Edition
Microsoft PowerPoint for Windows™
Microsoft Project for Windows™
The MS Entrepreneur Pack (Works,™ Publisher,™ Money,™ and games)
Borland Paradox® database and Quattro®Pro for Windows spreadsheet

Application Software Upgrades

You can upgrade from a choice of application software to Microsoft Office, CD-ROM version, for only **$99!** This single package has Word, Excel and PowerPoint. If the system you want comes with MS Works for Windows,™ you can upgrade to a choice of application software for only **$100.**

CD Software

MECC Education Pack

MECC, one of the leaders in educational software, has bundled four of its most exciting programs, including: Oregon Trail — an exciting journey through the Old West; Money Works/Clock Works — teaches your child about money and time; Story Book Weaver — allows the child to create storybooks with pictures, words and sounds; and Super Munchers — a computer trivia game for the whole family. **$59**

Just Grandma and Me™

One of the most popular interactive animated stories for children on the market, Just Grandma and Me is packed with multimedia sound effects, music and animation. **$39**

Microsoft Encarta Encyclopedia

Where typical encyclopedias end, Microsoft Encarta begins. It brings learning to life with words, images, animation and sounds. More than 25,000 articles help you learn about every subject from Aardvark to Zygote. Listen to over 350 music segments, hundreds of bird and animal sounds, over 100 readings by authors, and samples of more than 45 languages. Includes the complete text to the 29-volume 1992 Funk and Wagnall's New Encyclopedia. **$249**

Microsoft Dinosaurs

This program takes you back millions of years for a face-to-face encounter with dinosaurs. It's eye-opening education and awesome entertainment. **$55**

Microsoft BookShelf '93

The powerful interactive reference tool no PC should be without! Includes the Concise Columbia Encyclopedia, the American Heritage Dictionary, Roget's II Electronic Thesaurus, the World Almanac and Book of Facts 1993, Bartlett's Familiar Quotations, the Concise Columbia Dictionary of Quotations, and the Hammond Atlas. **$119**

The 7th Guest

The first interactive drama in a terrifyingly real virtual environment with real actors. The new standard in multimedia entertainment. The game's graphics are so real you'll think you're watching a movie. *(Caution — contains scenes of graphic violence.)* **$49**

Jazz: A Multimedia History

Travel on a musical journey with photos, video clips, sound effects, interviews and jazz music from 1923 to 1991. **$32**

The software listed here is sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

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HANDBOOK® 486SX-25

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- 25MHz SL Enhanced Intel® 486SX Processor
- 4MB RAM (expands to 20MB)
- 80MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS,® Windows™ & Serial Transfer Cable

$1495

HANDBOOK 486DX2-40

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- 40MHz SL Enhanced Intel 486DX2 Processor
- 4MB RAM (expands to 20MB)
- 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS, Windows & Serial Transfer Cable

$1995

NOMAD 450DXC

- Weight: 6.2 Lbs.
- Dimensions: 8.5" x 11" x 2.2"
- 50MHz Intel 486DX2 Processor
- 8MB RAM
- 3.5" 1.44MB Diskette Drive
- 200MB IDE Hard Drive
- 8.4" **Color Active Matrix Screen**
- NiMH Battery & AC Pack
- Simultaneous Video with 1MB
- 79-Key Keyboard
- Microsoft® Ballpoint Mouse
- 1 Parallel, 1 Serial Port
- MS-DOS, Windows & Works for Windows™

$3995

COLORBOOK 486SX-25

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 25MHz SL Enhanced Intel® 486SX Processor
- 4MB RAM (expands to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 80MB IDE Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Trackball (2 buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2® Ports
- External VGA Port
- MS-DOS and Windows

$1995

COLORBOOK 486SX-33

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 33MHz SL Enhanced Intel 486SX Processor
- 4MB RAM (expands to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 170MB IDE Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Trackball (2 buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Ports
- External VGA Port
- MS-DOS and Windows

$2395

COLORBOOK 486DX-33

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 33MHz SL Enhanced Intel 486DX Processor
- 4MB RAM (expands to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 170MB IDE Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Trackball (2 buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Ports
- External VGA Port
- MS-DOS and Windows

$2695

HANDBOOK PACKS

Traveler's Packs:

- Case, extra battery, alkaline battery pack & PCMCIA 96/24 fax/modem. **$369**
- Case, extra battery, alkaline battery pack & PCMCIA TelePath™ fax/modem. **$489**

Presenter's Pack:

- PCMCIA VGA adapter, Asymetrix® Compel & case. **$319**

COLORBOOK™ PACKS

Traveler's Packs:

- Case, extra battery & PCMCIA 96/24 fax/modem. **$329**
- Case, extra battery & PCMCIA TelePath fax/modem. **$449**

OPTIONS

PCMCIA Cards:

- TelePath fax/modem — 14,400bps send-receive fax, 14,400bps modem. **$319**
- Fax/modem — 9,600bps send-receive fax with 2,400bps modem. **$199**
- Ethernet adapter. **$189**
- Token Ring adapter. **Call**
- HandBook VGA adapter. **$229**

Batteries:

- 2.2Ah NiMH batteries. **$89** each
- HandBook alkaline battery pack. **$29**

Diskette Drive:

- HandBook 3.5" 1.44MB external diskette drive. **$99**

Cases:

- Padded, soft-sided black cases custom-designed for ColorBook or HandBook. ColorBook **$49** HandBook **$55**

Extended VIP Warranty:

- We'll ship a replacement notebook within 24 hours during one-year warranty. Must be purchased at point of sale. Call for details. **$100**

4MB or 16MB RAM Upgrades:

- Due to the volatility of the DRAM market, please call for pricing.

Easy Payment Options

We make it easy for you to buy a Gateway PC, too! We accept most major credits cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers.

You can also apply for our new Gateway 2000™ DuoLine™ MasterCard® Card, issued by Dial National Bank, which lets you make purchases from Gateway and anywhere else MasterCard is accepted by giving you two lines of credit — one for Gateway purchases and one for all other purchases. For Gateway purchases, the card has no annual fee and a low variable interest rate of just 12.9% APR. For other transactions, you get a variable interest rate of 13.9% APR and a low $18 annual fee.*

The Gateway interest rate translates into some low monthly payments for your PC. For example, payments on a purchase of $2,000 would be $60 per month for 42 months.** Ask your sales representative about the DuoLine MasterCard, or call 800-846-1781 for an application.

*Cash advance fee is $1 plus 2% of the amount of the cash advance, but not less than $5 nor more than $10. Financing is available on approved credit with the Gateway DuoLine MasterCard, issued by Dial National Bank, Des Moines, Iowa. **The final payment may be less. The total of all payments is $2,489.40 which includes $489.40 in finance charges. The example given above assumes you have no other balance on your Gateway line of credit and that the APR does not change. This information does not apply to the MasterCard line of credit, which has different terms.

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MINI DESKTOP SYSTEMS

4SX-33

- Intel® 33MHz 486SX Processor
- 4MB RAM
- 3.5" Diskette Drive
- 212MB 13ms IDE Hard Drive
- Intel Pentium™ Technology Ready
- Local Bus Graphics Accelerator w/ 512KB DRAM
- 14" Color CrystalScan® 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard
- Microsoft® Mouse
- MS-DOS,®Windows™ & Tools
- MS Works for Windows™
- EPA Energy Star Compliant

$1295 *4SX-25* **$1275**

4DX-33

- Intel 33MHz 486DX Processor
- 4MB RAM
- 3.5" Diskette Drive
- 212MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 512KB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- MS Works for Windows
- EPA Energy Star Compliant

$1495

MINI UPGRADE

At the time of purchase, you can upgrade your 4SX-25, 4SX-33 or 4DX-33 mini desktop system to include the following features:

- 128KB Cache
- 1MB Video DRAM
- 424MB 13ms IDE Hard Drive
- 124-Key AnyKey Keyboard
- Choice of Application Software

$225 *(A $275 value!)*

Sorry, offer good only at the time of system purchase.

4DX2-50

- Intel 50MHz 486DX2 Processor
- 4MB RAM, 128KB Cache
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey®Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1795

4DX2-66

- Intel 66MHz 486DX2 Processor
- 4MB RAM, 128KB Cache
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1995

HOME OFFICE PACK

Include these peripherals with your new Gateway desktop and you have everything you need for an efficient home office.

- Epson® Stylus 800 Ink Jet Printer
- TelePath™ II Fax/Modem
- 1 Parallel Cable

$429

Only with system purchase.

TOOLS ON TOP FROM CENTRAL POINT

Tools on Top™ is now included on all Gateway 2000 mini desktop, desktop and tower systems. Program includes file manager, desktop and emergency disk portions of Central Point's award-winning PC Tools for Windows.

Energy EPA POLLUTION PREVENTER

VESA SYSTEMS

4SX-33V

- Intel 33MHz 486SX Processor
- 4MB RAM
- 5.25" & 3.5" Combo Drive
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB™ Graphics Accelerator with 1MB DRAM
- 14" Color CrystalScan 1024NI
- Baby AT Case
- 5 ISA & 2 VESA®/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1495

4DX-33V

- Intel 33MHz 486DX Processor
- 8MB RAM, 128KB Cache
- 5.25" & 3.5" Combo Drive
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator with 1MB DRAM
- 14" Color CrystalScan 1024NI
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1995

4DX2-50V

- Intel 50MHz 486DX2 Processor
- 8MB RAM, 128KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator with 2MB DRAM
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Mierosoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$2295

66MHz BEST BUY

- Intel 66MHz 486DX2 Processor
- 8MB RAM, 128KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator with 1MB DRAM
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$2495

4DX2-66V

- Intel 66MHz 486DX2 Processor
- 16MB RAM, 256KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator with 2MB DRAM
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choiee of Application Software
- EPA Energy Star Compliant

$2995

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PENTIUM SYSTEMS

P5-60 BEST BUY

- Intel 60MHz Pentium™ Processor
- 8MB RAM, 256KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Graphics Accelerator with 2MB DRAM
- 14" Color CrystalScan® 1024NI
- Tower Case with 300-Watt Power Supply
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 124-Key AnyKey® Keyboard
- Microsoft® Mouse
- MS-DOS,® Windows™ & Tools
- Choice of Application Software

$2995

P5-60

- Intel 60MHz Pentium™ Processor
- 16MB RAM, 256KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 528MB 12ms IDE Hard Drive
- PCI Local Bus Graphics Accelerator with 2MB DRAM
- 17" Color CrystalScan 1776LE
- Tower Case with 300-Watt Power Supply
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software

$3995

PCI 486 SYSTEM

P4D-66

- Intel 66MHz 486DX2 Processor
- 16MB RAM, 256KB Cache
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Diamond Viper Graphics Accelerator with 2MB VRAM
- 15" Color CrystalScan 1572FS
- Tower Case with 300-Watt Power Supply
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software

$3295

ULTIMATE UPGRADE

For the ultimate in performance, upgrade any 16MB desktop configuration to:

- 32MB RAM
- Diamond Viper Graphies Aecelerator with 2MB VRAM

$999

Sorry, offer good only as an upgrade at the time of system purchase.

MM UPGRADE

Here's everything you need to add multimedia to any Gateway desktop PC. You won't find a better holiday price anywhere!

- Gateway 2000 16-Bit Sound Card, Sound Blaster-™ Compatible
- Double-Speed CD-ROM
- 2 Labtec® Speakers
- Microsoft Encarta
- System CD

$299

For system configurations that include a CD-ROM drive: **$132**

Only with system purchase.

SERVICE

Every Gateway 2000™ system is baeked by:

- 30-Day Money-Back Guarantee
- One-Year Limited Warranty
- Lifetime Toll-Free Technical Support
- On-Site Service Available To Most Locations
- Lifetime BBS Membership
- FaxBack Automated Fax Service

Our money-back guarantee does not include shipping. On-site service is provided free of charge if our technicians determine it is necessary during the warranty period. If you'd like to read the details of our warranty, guarantee and on-site service program, please call for a free copy.

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SOFTWARE CHOICES

If a system comes with "choice of application software," choose one of the following packages:

- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf '92,® CD-ROM Edition
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- The MS Entrepreneur Pack (Works,™ Publisher,™ Money,™ and games)
- Borland Paradox® database and Quattro® Pro for Windows spreadsheet

MICROSOFT® WINDOWS™ READY-TO-RUN

Her work all but finished,
the night nearly through,
The Cow looked right at me
and gave me a moo!
She spoke not in words, but I
read in her voice
The message that Gateway's
the logical choice.

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I woke with a start! Was I dreaming it all?

No matter, I mused, for sure Gateway I'll call.

Then I heard her exclaim as she drove out of sight,

"Happy holidays to all,
and to all a good night!"

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610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000
Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561
Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

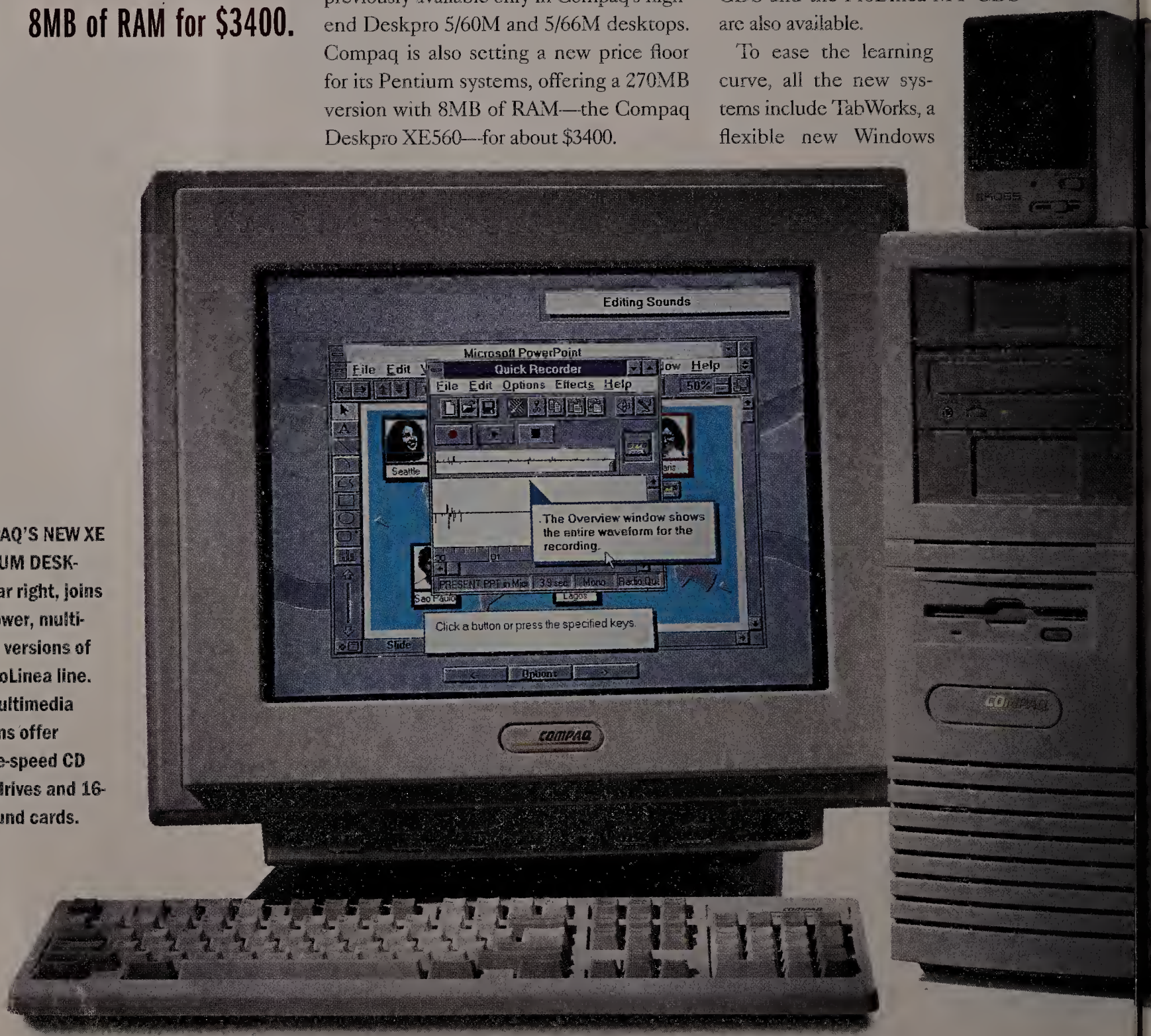
AFFORDABLE PENTIUMS

The new XE line includes the first implementation of plug and play and a Pentium system with a 270MB hard disk and 8MB of RAM for $3400.

TEST DRIVE ▶ Compaq is replacing its Deskpro/i series of mid-range desktops with four Deskpro XE systems, three of which offer the benefits of plug and play. The fourth, a Pentium version, does not have this feature, but it does have Compaq's speedy TriFlex/PC Architecture with its 64-bit processor bus, previously available only in Compaq's high-end Deskpro 5/60M and 5/66M desktops. Compaq is also setting a new price floor for its Pentium systems, offering a 270MB version with 8MB of RAM—the Compaq Deskpro XE560—for about $3400.

Compaq has also added three minitower models to its entry-level Presario line and five systems to its entry-level ProLinea business line. The latest ProLineas include a network-ready integrated monitor and system model, three minitower configurations, and a multimedia desktop. Multimedia models of both lines—the Presario 833 CDS and the ProLinea MT CDS—are also available.

To ease the learning curve, all the new systems include TabWorks, a flexible new Windows



COMPAQ'S NEW XE PENTIUM DESKTOP, far right, joins minitower, multimedia versions of the ProLinea line. The multimedia systems offer double-speed CD ROM drives and 16-bit sound cards.

Edited by Russell Glitman

FROM COMPAQ

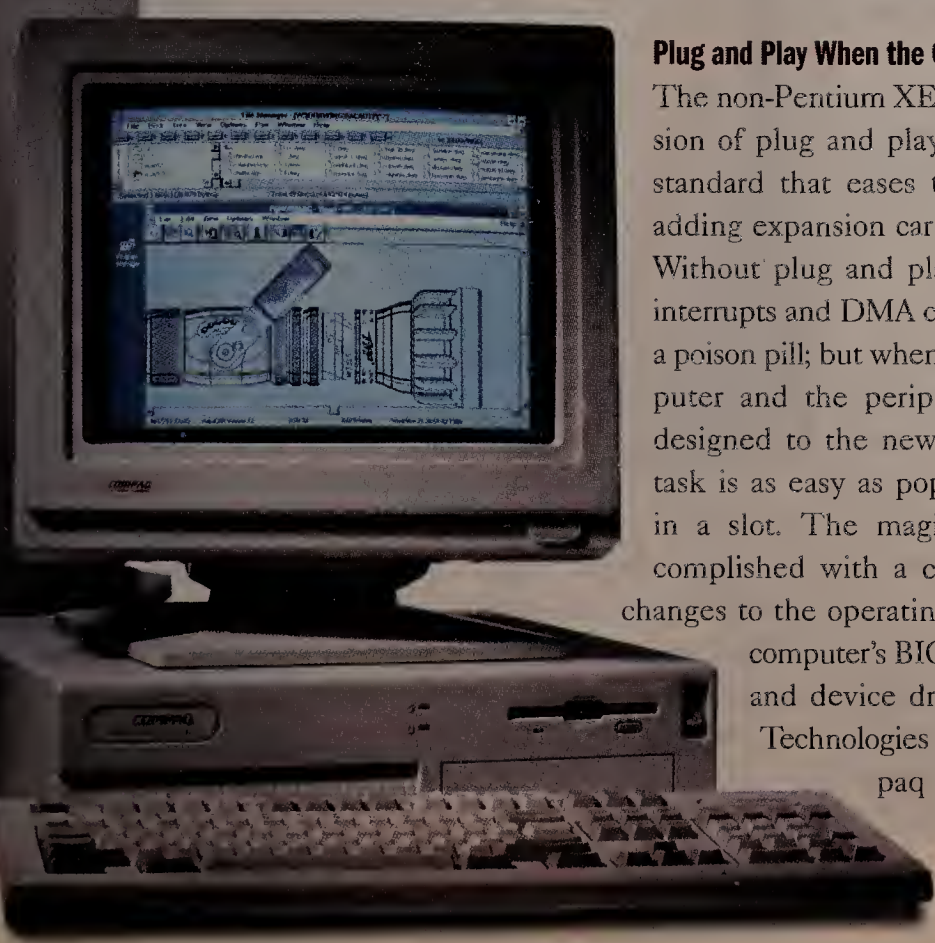
front end designed to make Compaq systems the easiest Windows machines for novices. TabWorks was developed by the famed Xerox Palo Alto Research Center (PARC), which invented the desktop mouse and developed the concept for a graphical user interface later adopted for both the Apple Macintosh and Windows.

Compaq's Windows Alternative

TabWorks replaces each Windows program group with a "page" bearing a tab labeled with the name of the program group. Click the tab and the group's icons appear. Various hand-holding features are included, such as automatic prompting to create a new icon every time a file is written to disk (but just wait until you receive a 37-page fax—you'll get 37 dialog boxes asking if you want to create an icon).

Compaq officials claim tests conducted by it and Xerox PARC revealed that new Windows users make fewer than half as many mistakes when using TabWorks as compared with Program Manager and that it doesn't slow down experienced users. Experienced users, however, will be better served with a Windows desktop such as Central Point's PC Tools.

With the new XE line, Compaq has also enhanced its proprietary QVision graphics system by moving it to a local bus and improving drivers. The result: More than double the performance of past versions, according to the company. (These drivers are available to all current QVision users and should improve the performance of older Compaq models as well.) While this improvement makes QVision faster than many current local bus systems, the company's own tests found it to be less than half as fast as the fastest graphics cards on the market, such as the local bus Diamond Viper. The QVision controller includes 1MB of RAM and supports 256 colors at 1024 by 768 resolution. It can be expanded to 2MB to support additional colors. Pentium models offer 1280 by 1024 resolution.



Plug and Play When the Cards Arrive

The non-Pentium XEs feature a version of plug and play, an emerging standard that eases the process of adding expansion cards to your PC. Without plug and play, sorting out interrupts and DMA channels can be a poison pill; but when both the computer and the peripheral card are designed to the new standard, the task is as easy as popping the card in a slot. The magic will be accomplished with a combination of changes to the operating systems, the computer's BIOS, and devices and device drivers. Phoenix Technologies Ltd. and Compaq are the first to develop plug-

News Monitor

64-BIT GRAPHICS: Expect a flurry of high-performance, 64-bit graphics boards to reach store shelves by year-end. Vendors such as ATI, Number 9, Diamond, and Matrox plan to introduce 64-bit boards at street prices at or below $500. For instance, Matrox's new MGA II board with 2MB of VRAM lists for $599. Built for VESA and PCI local bus architectures, the new 64-bit boards target power users running graphics-intensive desktop publishing, imaging, and CAD applications.

VL BUS RIDES AGAIN: From the folks who brought us the wildly popular VESA local bus standard comes a new version of the spec. It calls for a 64-bit-wide data path and a top bus speed of 50 MHz. VESA 2.0 systems and peripherals will offer many of the advantages of the long-awaited PCI bus—though they will lack key features, such as automated peripheral installation and a power-saving 3.3-volt capability, that are part of PCI.

CHIPS KEEP ROLLING IN: New processors from IBM, Cyrix, and Texas Instruments may exert pricing pressure on Intel products while providing consumers with more choices.

TI's new 486SXL line, which targets portable computing, is based on Cyrix's version of Intel's 486SX technology. TI has replaced the Cyrix design's internal 1K cache with an 8K cache for added speed. The chips feature power management for portable computers. A 5-volt model will be available in 33-MHz, 40-MHz, and clock-doubled 25/

(continued on page 81)

PHOTOS: JOHN GREENLEIGH ILLUSTRATION: BILL FRAMPTON

Top of the News

Continued from page 79

and-play BIOS's, while Intel has developed a configuration utility to support a limited version of the standard under Windows 3.1. Microsoft recently released an Application Programmer's Interface (API) compatible with Windows 4.0, which will truly usher in the standard when it is released in about a year.

The Compaq XEs support passive plug and play, which means that the machine must be turned off while new devices are installed. Active plug and play will become more desirable as the use of easily swapped-out PCMCIA devices becomes more common. To take advantage of plug and play, you will also need Intel's configuration utility or Windows 4.0, neither of which was available at press time.

All of the XEs except the power-hungry Pentium models are certified in the Environmental Protection Agency's Energy Star program, which requires a computer system to draw less than 60 watts of power in an idle state. With the XE, you can choose from a number of time-out and partial power-down options for the monitor, CPU, hard drive, and expansion slot array (you can maintain power to your slots so you won't have to log on to the network every time you wake up your machine).

Compaq also took a number of steps to improve its multimedia systems. In the Presario and ProLinea models, a 16-bit Creative Labs Sound Blaster card now generates the sound, and the system features a standard SCSI bus. A double-speed CD ROM drive is included, along with a redesigned microphone that eliminates the monitor hiss that sometimes interfered with Compaq's Business Audio recordings. However, the pair of low-end speakers that comes bundled is suitable perhaps for recreation but not for serious presentations. The ProLinea CDS is available as a desktop machine with a 486SX-33 processor or as a 486DX-33 or 486DX2-66 minitower. Both models feature a 340MB hard drive and 4MB of RAM.

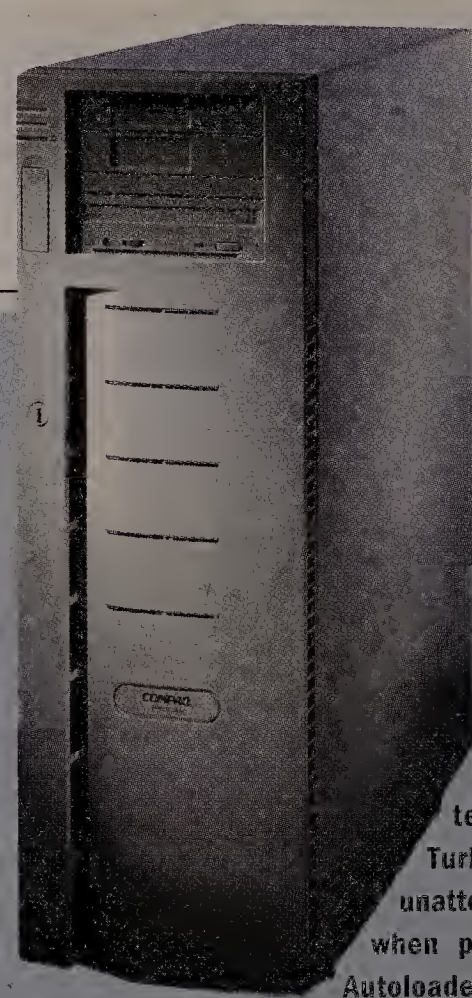
Compaq took steps to improve its multimedia systems, adding a 16-bit Sound Blaster card and double-speed CD ROM drives to the Presario and ProLinea lines.

The XE line features a new 16-bit version of Compaq's Business Audio, which has been enhanced with 15:1 compression of sound files. Business Audio is now compatible with Sound Blaster, so you can play games written to that standard.

Six of the eight new ProLineas and Presarios feature a roomier minitower case offering greater expansion capabilities to meet the needs of multimedia users. Expansion options range from the two-slot, two-bay configuration of the all-in-one Presario and ProLinea models to the three-slot, three-bay ProLinea towers and the five-slot, five-bay minitower Presarios.

The minitower Presarios are available with a 486SX-33, 486DX2-50, or 486DX2-66 processor, with the option of a 210MB, 240MB, or 340MB hard drive.

The new ProLineas in-



Easy-to-Install ProLiant Servers: Servers have traditionally been so difficult to set up and maintain that they required the services of highly trained technicians or consultants. A bold new Compaq design, the ProLiant family of file servers, smooths the process by emphasizing ease of use, low cost, and high reliability. It may attract a broader group of users.

The ProLiant 1000, available with a 486-66 or Pentium CPU, starts at $6000. The ProLiant 4000, which is capable of symmetric multiprocessing with up to four 486-50 or Pentium chips, starts at less than $14,000.

The ProLiants are built around a set of features designed to ensure smooth installation. At the core of the installation process is SmartStart, a hardware and software setup process that manages an intelligent installation of Novell NetWare, Windows NT, or SCO UNIX. After choosing an operating system and giving your credit card number to a Compaq reseller, which in turn provides you with a key code, you select one of the four CDs included with SmartStart. Then, just sit back and watch the installation.

Daily maintenance is simplified by a set of features called Full-Spectrum Fault Management. These include an insight manager, which monitors key operating and performance parameters, and a rapid recovery feature, which automatically restores normal operation in the event of a failure. An enhanced warranty even covers replacement of deteriorating components before they fail.

ProLiants include a DualPort Ethernet controller and a NetFlex-2 adapter incorporating Texas Instruments' Packet Blaster technology. A 4GB or 16GB TurboDAT tape drive allows for unattended backup of up to 96GB when paired with the TurboDAT Autoloader. The Compaq Uninterruptable Power Supply interacts intelligently with the ProLiant to provide an automatic, orderly shutdown in the event of a power failure.

The ProLiant 1000 comes with 16MB of RAM, expandable to 128MB in the 486-66 model or 144MB in the Pentium model, and offers hard drive options of 550MB, 1.05GB, and 2.10GB. Compaq Computer Corp., 800/345-1518. Reader service no. 822

—Joe Abernathy

PHOTO: JOHN CORNISH; ILLUSTRATION: BILL FRAMPTON

MAKING WINDOWS SIMPLE: TabWorks, Compaq's front-end alternative to Windows, employs a notebook metaphor to help novice users.

clude a 486SX-25 model that features the same integrated system-monitor combination case as the popular entry-level Presario. You can opt for either no hard drive or a 120MB or 200MB drive, and it includes a built-in 14-inch color monitor with .28-millimeter dot pitch. The version with no hard drive includes either a token-ring or an ethernet adapter card integrated onto the motherboard. (Competing machines from IBM, Dell, and Gateway offer network cards as an option.)

The multimedia desktop 486SX-33 ProLinea comes with a choice of a 120MB, 240MB, or 340MB hard drive. The new minitower systems come with a 486SX-33, 486DX2-50, or 486DX2-66 processor and a 210MB, 340MB, or 525MB hard drive.

The new Deskpro XE line is available in 486SX-33, 486DX2-50, 486DX2-66, and 60-MHz Pentium models, with a choice of 170MB, 270MB, 340MB, and 525MB hard drives. All of the XE models come configured with 8MB of RAM; all other Compaq desktops come with 4MB of RAM, except the 525MB hard drive models, which come with 8MB. DX2 XE models expand to 64MB of RAM, while Pentium models accept up to 136MB.

All of the Compaq machines come with either a 5¼- or a 3½-inch floppy drive, a mouse, a 9600/2400-bps fax/data modem (except the XEs), and a software bundle that includes MS-DOS 6.0, Windows 3.1, and TabWorks. Various other software titles are also available depending on the model you choose.

Compaq also announced that its marketing strategy would change to better match particular models to the stores in which they're most likely to find buyers. The Presario will replace the ProLinea on the shelves of merchants geared to the mass-consumer market, while the ProLinea will be sold in stores such as CompUSA that serve the low- to medium-end business buyer. The XE and M models also can be purchased in such stores, usually by special request, and from value-added resellers and high-end dealers. The Deskpro/i series will be available for a period of time to accommodate corporate buyers who have already specified it in their budgets.

—Joe Abernathy

Compaq XE line; Presario and ProLinea minitower, integrated, and multimedia models

Compaq unveils plug and play as it revamps the midrange of its desktop line and adds multimedia features to its popular entry-level lines.

Key Features: XE—plug and play • TriFlex/PC Architecture • ProLinea MTCDS and Presario 800 CDS—16-bit audio • Double-speed CD ROM drive

Estimated street pricing: Deskpro XE begins at $1499, ProLinea Net 1/25s (without hard drive) begins at $1099, ProLinea MT CDS (with hard drive) begins at $1899, Presario 633 CDS multimedia begins at $1699, Presario 800 CDS series begins at $1899

Availability: Immediate

Compaq Computer Corp., 800/345-1518

Reader service no. 823

News Monitor

(continued from page 79)

50-MHz versions. TI will offer a 3.3-volt model in 33- and 20/40-MHz versions. Production is expected to begin in the first quarter of 1994.

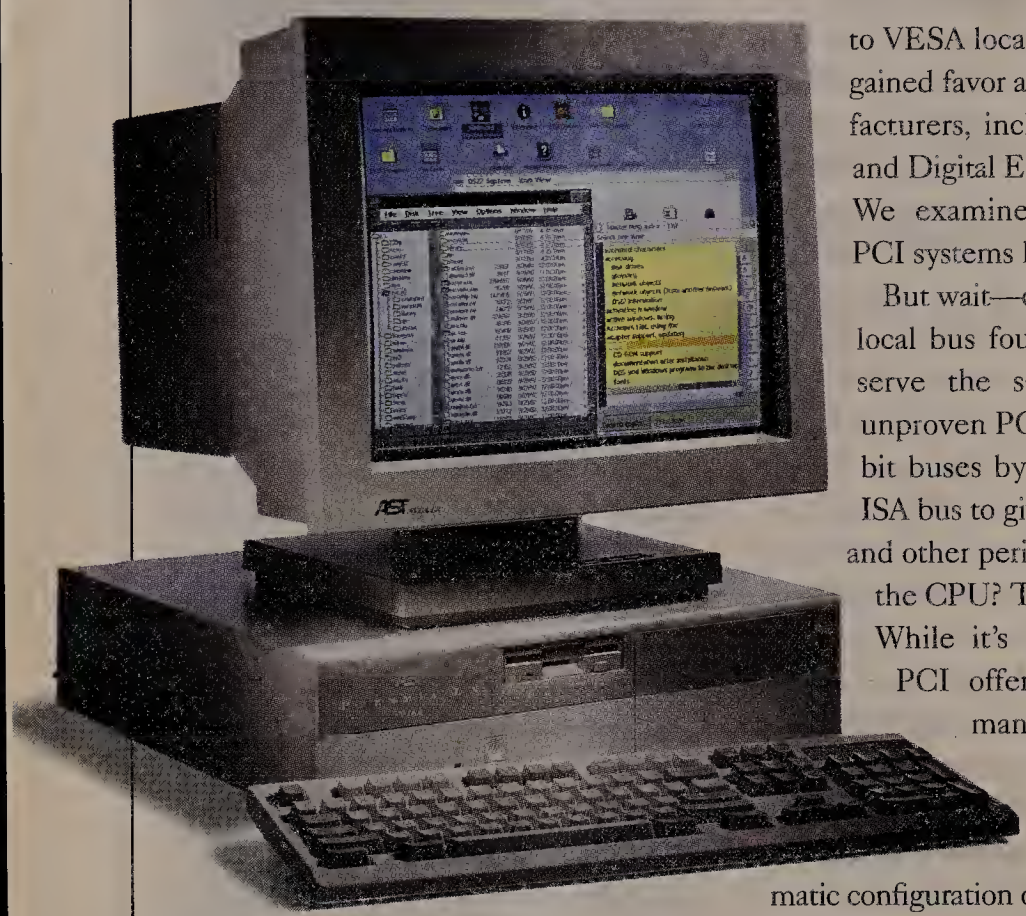
IBM, meanwhile, plans to ship its clock-doubled and clock-tripled Blue Lightning processors by the end of 1993. Because of limitations in its license with Intel, IBM must ship the parts on a complete motherboard; however, IBM will sell the entire motherboard for about the price of Intel's CPU. Blue Lightning will be sold in speeds rated at 25/50, 33/66, 25/75, and 33/100 MHz. All of the parts consume 3.3 to 3.8 volts and feature full power management. Potential customers include Alaris, Cache Computer, CompuAdd, Destiny, ETEQ, and the IBM PC Company.

Finally, Cyrix challenged Intel's Pentium processor with its M1—architecture that will form the basis of a family of superscalar, super-pipelined processors running at 100 MHz and beyond. The first products based on M1 will be announced in 1994.

AMERICA GETS WIRED: The administration's plans for a data superhighway are emerging in the form of several pieces of legislation and a National Information Infrastructure (NII) blueprint and task force. Developed by Vice President Al Gore, the longtime patron saint of the Internet computer network, the NII blueprint drew fire for favoring commercial interests. In response, a task force was convened to plan a data superhighway that will benefit the public interest and create jobs.

(continued on page 83)

AST, DEC Roll Out PCI Bus Systems



POWERFUL PAIR: Pentium/PCI combo gives AST's Premmia LX, above, a performance kick.

TEST DRIVE ▶ There's a new local bus in town. Named Peripheral Component Interconnect, or PCI, this new peripheral-bus standard is designed specifically for the new breed of high-performance CPUs such as Intel's Pentium, DEC's Alpha, and MIPS's R4400. Devised by Intel as a technically superior alternative to VESA local bus, PCI has quickly gained favor among major PC manufacturers, including AST Research and Digital Equipment Corporation. We examine their preproduction PCI systems here.

But wait—doesn't the VESA (VL) local bus found in most new 486s serve the same purpose as the unproven PCI? And don't both 32-bit buses bypass the poky 8-MHz ISA bus to give graphics subsystems and other peripherals a faster path to the CPU? The short answer is yes. While it's questionable whether PCI offers much of a performance boost over VL for non-Pentium systems, PCI does offer the advantages of automatic configuration of add-on boards, a low-voltage design, and a 64-bit interface, according to Intel and PCI system manufacturers. (For an in-depth discussion, see "VL vs. PCI: Betting on a Bus.")

AST Premmia LX

AST Research is fast out of the gate with a Pentium/PCI system, the Premmia LX. Designed by Intel, this high-powered desktop features a 60-MHz Pentium processor and a 256K external cache, and comes in two flavors. The Model 3 is a stripped-down unit with only a 3½-inch floppy drive and 8MB of RAM. The Model 543W comes with 16MB of RAM, a 3½-inch floppy, a 540MB IDE hard drive, a mouse, Windows, and DOS. AST expects Model 3 pricing to start around $3000, and the Model 543W at $4475. Both come with 1MB of video RAM, upgradable to 2MB.

Each Premmia LX has two PCI slots and three ISA slots. Since the PCI local bus video is integrated on the motherboard, the PCI slots will handle add-on boards such as the SCSI cards and network adapters starting to hit the market. The system has a zero insertion force socket for easy processor upgrades (such as to Intel's 66-MHz Pentium) and a 145-watt power supply.

The size of the Premmia LX belies its power: Its case measures just over 4 inches high, 17 inches wide, and 16 inches deep. Getting inside the system is easy. A mere two screws hold the lid in place, but you'll need a screwdriver to remove them.

DECpc XL: Pick Your Power

Digital's DECpc XL series is one of the most upgradable of the PCI systems we've seen. The series consists of a single high-performance chassis sold with a choice of

Compaq's Mobile Companion: With the Apple Newton personal digital assistant and the competing Tandy Z PDA getting bad reviews because of immature handwriting recognition, Compaq recently disclosed its vision for an entirely different type of portable computing device. Dubbed the Compaq mobile companion, the device will serve as an extension of the Windows desktop and the local area network, rather than as a primarily stand-alone product.

Using Microsoft Windows at Work software, the Compaq device will be available sometime in 1994 in a variety of form factors. A basic device will be able to use dial-up communications to communicate with your desktop machine, while high-end mobile companions will have wireless modems, letting you, for example, tap your spreadsheets and other important data during conferences.

The product will use the Polar Chip Set developed by VLSI Technology, Intel, Microsoft, and Compaq. This chip set offers advanced power management and communications features designed for mobile devices. (VLSI also makes the Advanced Risk Machine chip set used in the Apple Newton MessagePad.)

LAN users who want to get the most from their Windows investment are the target audience of the Compaq mobile companion. The unit will be marketed as an adjunct to the desktop machine—a tool for retrieving and using information, not generating it.

PCI Gives AST and DEC Systems a Boost

System	CPU/Bus	RAM (MB)	Freelance 1.0	Word for Windows 2.0	Excel 4.0
AST Premmia LX	Pentium/ISA, PCI	16	1:26	1:23	0:8[illegible]
AcerPower P60e	Pentium/EISA, VL	16	1:46	1:25	1:10
DECpc XL	486-66/ISA, PCI	8	1:38	1:35	1:17
Zeos 486DX2-66	486-66/ISA, VL	8	1:40	1:36	1:24

Time in minutes:seconds. All systems have a 256K secondary cache.
Data based on tests designed and conducted by the PC World Test Center.

CPU cards ranging from 486DXs to Pentiums to one of the fastest chips available for PCs: DEC's own 150-MHz Alpha AXP 150. These daughtercards can be installed by the user. The XL also offers a variety of PCI peripherals including high-performance video cards, SCSI hard drives up to 2GB, and an included double-speed CD ROM drive. Because of its limited number of slots and bays, the DEC PC XL series is best suited for use as high-performance desktop systems rather than as dedicated servers on a large network.

In *PC World* tests, a preproduction DEC 66-MHz 486DX2 with a Diamond Viper video subsystem and a 1GB hard drive performed better than a comparable VL bus system (see chart). This model with a 15-inch monitor is expected to cost about $4900. A preproduction Premmia did better than a comparable VL EISA system.

DEC's XL series gets its flexibility from a system design that uses CPU cards that plug into a proprietary slot boasting a direct 64-bit connection to main memory. Both the Alpha and Pentium processors have 64-bit external connections and need a data path that wide for maximum performance. (Systems with narrower, 32-bit memory buses can produce a memory bottleneck.) Digital plans to offer 33-MHz 486DX, 66-MHz 486DX2, 60- and 66-MHz Pentium, and 150-MHz Alpha AXP processor cards.

The XLs offer a selection of PCI peripherals. The standard video subsystem includes S3's 928 processor with 1MB of VRAM. For more demanding applications—and an additional $300—Digital sells the Diamond Viper subsystem with 2MB of VRAM. A SCSI-2 adapter connected to the 32-bit PCI bus is on the motherboard and supports a daisy-chained hard drive and the included double-speed CD ROM drive. The systems accept up to 192MB of RAM, include five bays (two free), two PCI slots (one used by the video card), three ISA slots, and one interleaved PCI/ISA slot.

—Jeff Bertolucci and Randy Ross

AST Premmia LX

One of a new generation of fast desktops with Intel's 60-MHz Pentium processor and the 32-bit PCI local bus.
Key Features: PCI local bus for a faster data path between select peripherals and the CPU • 16MB RAM upgradable to 128MB • 540MB hard drive • 256K secondary cache • 1MB of video RAM
Pricing: Starts at $4475
Availability: Immediate
AST Research, 800/876-4278
Reader service no. 824

DECpc XL series

High-performance desktop offers wide variety of CPUs.
Key Features: User-upgradable CPUs from 486DXs to Pentiums to an Alpha AXP • 32-bit PCI bus
Pricing: 66-MHz 486DX2 with 15-inch monitor, 340MB SCSI and CD ROM drives, 8MB RAM, about $3800; 60-MHz Pentium system about $4500, upgrade card with trade-in $1199
Availability: Immediate
Digital Equipment Corp., 800/722-9332
Reader service no. 825

News Monitor

(continued from page 81)

In Congress, a number of bills aim to develop aspects of the "information society." The House recently passed and sent to the Senate the National Information Infrastructure Act of 1993, which promotes remote teaching, library access, health care, and online government access. The Senate is considering a similar bill of its own—the National Competitiveness Act of 1993. Other bills seek to promote competition in telecommunications and provide access to government databases.

FAXING DATA FILES: Let's face it: Communications programs are a drag. Setting up a modem-to-modem file transfer means tinkering with data bit, stop bit, parity, and bps rate settings. But there's good news. Soon you'll be able to send binary files using fax software. The CCITT, the international standards body responsible for all those V.*whatever* communications protocols, is currently working on a binary transfer standard that will enable you to send a file as easily as you send a fax. Starting next year, most popular fax programs will support this standard.

DELL RECALLS 320SLI: Dell Computer has recalled all of its 17,000 320SLi notebooks due to fire danger. The problem: A capacitor on the motherboard can crack when you plug in the power cord. If a crack occurs, the capacitor can overheat, creating a fire hazard. To return a 320SLi machine, call Dell at 800/847-4171.

(continued on page 85)

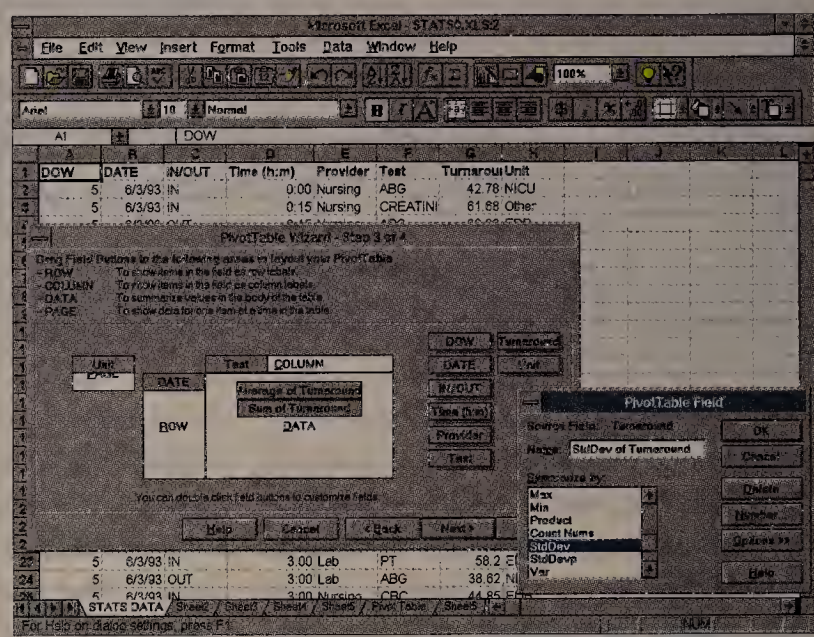
Excel 5.0: More Accessible, Flexible,

TEST DRIVE

What unprecedented, mind-boggling features has Microsoft introduced in the latest release of Excel? None. What Microsoft has done is much more important: Instead of adding more advanced features, it has concentrated on making its spreadsheet more accessible, more flexible, and better integrated with its other Windows applications. As beta user Tim Landgrave said, Excel 5.0 is like an Oreo: It's always had the sweet stuff inside, and now Microsoft has put the cookies on it.

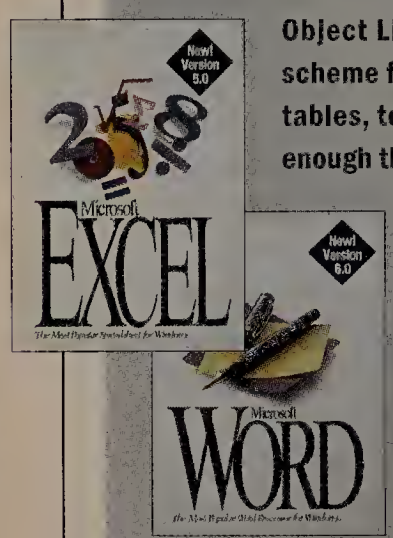
Perhaps you've been frustrated trying to import text data from a mainframe system into your spreadsheet? No more: Excel 5.0's new Text Import Wizard makes short work of that chore. Maybe you've been baffled by Excel 4.0's arcane macro language? Now there's a new one—Visual Basic for Applications—that's amazingly easy to learn, debug, and use. Or maybe you've coveted Quattro's multipage, notebook-style worksheets? Excel 5.0's got 'em. And its PivotTable, which replaces 4.0's Crosstab, is the slickest data modeling tool this side of Improv.

But the best part of the release is the small stuff, the "fit and finish" features that make any good tool a joy to work with. Two small enhancements illustrate what this new release is all about. Consider the humdrum job of sorting a list. Excel 5.0 makes it at once simpler and more flexible: To sort a table, you just select a cell in the column you want to sort by and click a button. Excel automatically selects the appropriate range and sorts it. It even figures out whether your table has column headings, formatting, and so forth, and if so, it omits them from the selection. On



EXCEL'S FLEXIBLE PIVOTTABLE FEATURE PROVIDES INTERACTIVE DATA MODELING within your spreadsheet.

Information at Your Fingertips? Braving the New World of OLE 2.0



Object Linking and Embedding, OLE, is Microsoft's scheme for letting Windows apps share data—charts, tables, text, and so on. OLE 1.0 has been around long enough that most Windows users think nothing of copying a chart from Excel, for instance, and pasting it into Word or Freelance. OLE 2.0, slated to appear with the upcoming releases of Word and Excel, promises a lot more: Instead of using the Clipboard, you'll be able to simply drag an object such as a chart from one application window to another. Once there, you can edit it in place: When you double-click on an embedded object, the menus, tool bars, and other controls of the host application are replaced by those of the embedded object's application; this means you can work on the object within the finished document, but with all the appropriate tools from the original.

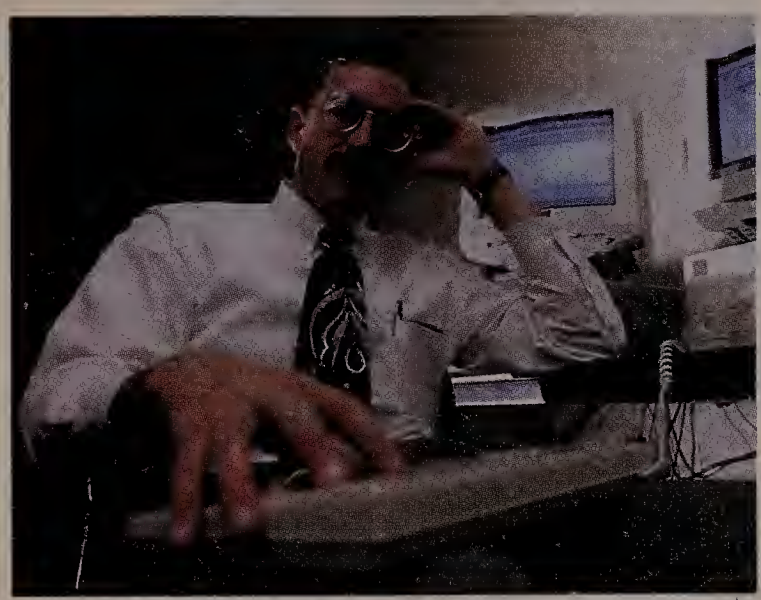
Other refinements also reflect this document-centered approach, including file links that remain connected when you copy or move the source files, embedded objects that can overlap page boundaries in the host document, the ability to link to an object that contains its own linked objects, and programming controls that let developers write Word macros that execute Excel operations and vice versa. Users can concentrate on their documents rather than the applications that produce them—or that's the promise.

What about the reality? How well does OLE 2.0 handle down-and-dirty, everyday computing chores? Beats me. After many weeks of wrestling with Word and Excel beta releases that just couldn't seem to get it together, followed by several days of trying to make OLE 2.0 work, I'm still not sure. Yes, I could drag an Excel chart into a Word document. But when I double-clicked to edit it in place, I ended up in Microsoft Draw instead of Excel. On the next try, a double-click took me to my worksheet, but to sheet 1, not to sheet 3 where the chart was. So then I tried embedding a simple table of numbers. Double-click. Great: Here I am looking at a Word document with Excel menus and tool bars, and I can do spreadsheet stuff right there. But the table has now assumed a different size, so I'm not sure when I exit how it's going to fit. And I keep running out of memory (my system has 16MB).

Bottom line: OLE 2.0 is another example of Microsoft's pioneering vision of computing. But from my view, it's not quite ready. Let's wait to see how the final product irons out the glitches.

and Integrated

the other hand, the sort dialog box still gives you complete control over the sorting process. The program even lets you define a custom sort sequence, such as "January, February..." or "Raleigh, Apex, Durham, Chapel Hill...," so you can organize a list precisely the way you want it (those same sequences work with the autofill feature, so you can recreate a custom sequence of cell entries with a drag of the mouse). This kind of attention to detail was reflected throughout the prerelease version; these are the kinds of improvements that pay solid returns in enhanced user productivity and gentler learning curves.



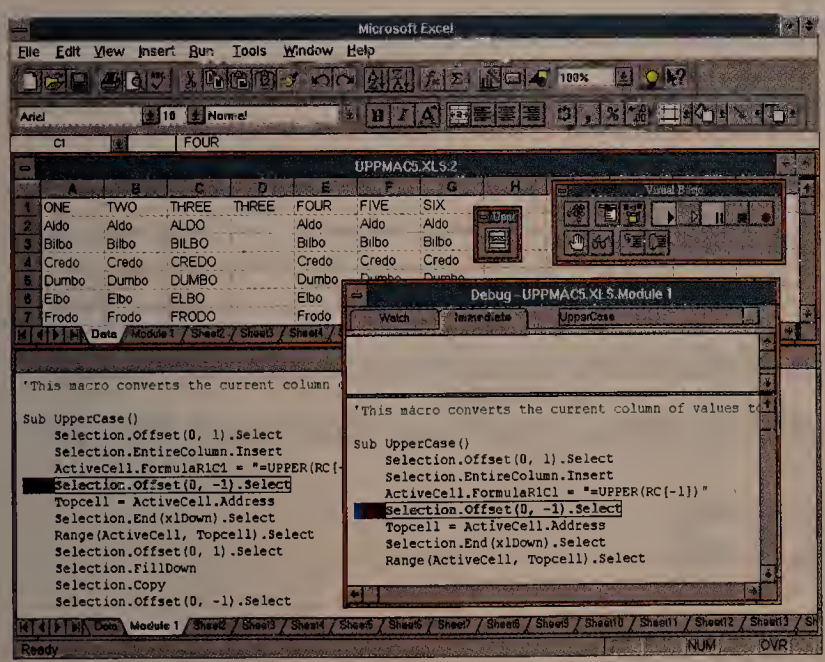
EXCEL 5.0 IS LIKE AN OREO, says beta tester Tim Landgrave: It's always been sweet inside, but now it has cookies on it.

Face to Interface

Current Excel users will experience a brief disorientation at first: The organization of the menus and dialog boxes has been radically improved, and many menu options now cascade into submenus. To decrease the number of trips you must make into the menus, dialog boxes, such as for cell formatting, now contain their own menus, which appear as tabs, so you can change many cell attributes before returning to the sheet. You can "tear off" the palettes for colors, borders, and patterns; park them on the worksheet; and swiftly change the properties of many objects. As in Quattro Pro and 1-2-3 release 4.0, Excel's worksheets are at last three dimensional, with page tabs at the bottom of the sheet that you can name and drag, 3-D formulas and range names, and special pages for macros and charts.

New help features mean fewer trips to the documentation: A Wizard aids in building functions, pop-up Tool Tips appear whenever you hesitate with the mouse pointer on the tool bar, and a Tip-Wizard monitors your command activity and suggests more efficient ways to accomplish those tasks.

Charts have gained some long-awaited features, such as error bars and trend lines, and it's easier to format them accurately—you



EXCEL'S MACRO LANGUAGE IS REPLACED with a version of Visual Basic that has powerful editing and debugging tools.

PHOTO: PATRICK PFISTER; ILLUSTRATION: BILL FRAMPTON

News Monitor

(continued from page 83)

MAIL-ORDER PROTECTION EXTENDED: The Federal Trade Commission has extended its consumer protection rules for mail-order sales to include purchases by phone or fax. (Previously, the rules applied only to goods ordered and paid for by mail.) That's good news for PC and software buyers.

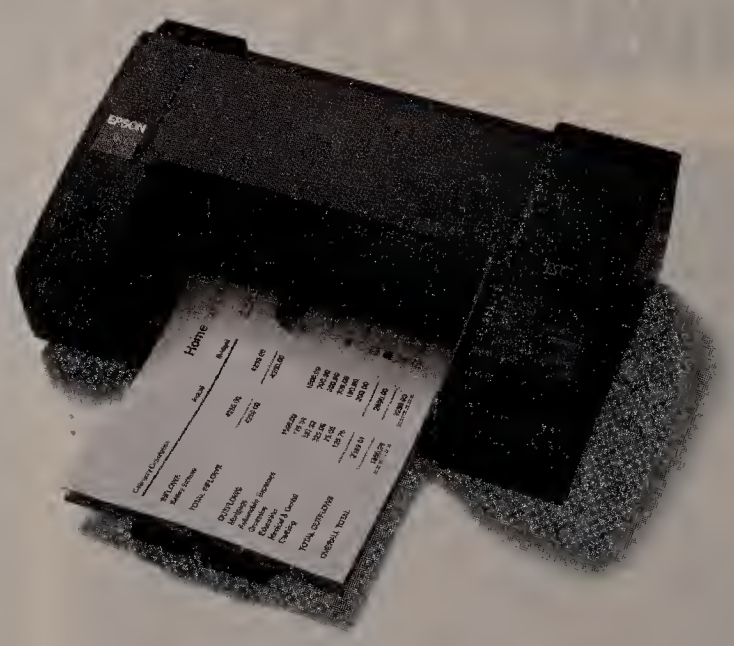
Effective March 1, consumers who buy by phone or fax will get added protection regarding shipping deadlines, delay notices, cancellation rights, and refunds. According to the FTC rules, a vendor must be able to provide reasonable evidence it can ship a product within the time promised in an advertisement. If no time period is specified, the rule creates an implied period of 30 days. That 30-day period starts when the vendor receives the order. After 30 days, if a vendor does not, or cannot, ship the product, it must notify the consumer of the delay and provide a new ship date. At that time, the vendor must also give the consumer the option to cancel the order and receive a refund instead.

The rules also specify that cancellations must be at the vendor's expense: Vendors must provide an 800-number or postage-paid postcard. Companies that fail to comply with the new rules can be fined up to $10,000 per violation, says Joel Brewer, an FTC lawyer. The new rules apply only to merchandise, not services.

—Edited by Randy Ross

Contributors: Joe Abernathy, Jeff Bertolucci, Laurianne McLaughlin, and Michael Desmond

The Stylus 300 ink jet is the best value in its class.



Epson Stylus 300 Thermal Ink Jet

If you want great quality printing and a great value, you want the Epson Stylus 300. The Stylus 300 is the latest addition to our award-winning Stylus line of ink jet printers. The Stylus 300 delivers printing so clean and crisp, you'll be amazed it's so affordable. In fact, of all the low-cost thermal ink jets, including HP's DeskJet 500 and Canon's Bubble Jet 200, there's no better value than the Stylus 300. And nothing else in its class has the worldwide Epson reputation for reliability.

All printers in the Epson line of Stylus ink jets are backed by a solid two year warranty, and by the Epson Connection toll-free help line. For information about the Epson Stylus

*Based on an independent test comparing the standard printing modes for the Canon Bj-200, the HP DeskJet 500 and the Epson Stylus 800. All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers, including Canon which is registered by Canon Inc. and HP which is registered by Hewlett Packard Co.

The Stylus 800 is in a class by itself.

Epson Stylus 800 Piezo Ink Jet

If you want the finest ink jet technology ever offered, there's only one choice. Step up to the extraordinary Epson Stylus 800. Epson's permanent Piezo print-head is a major breakthrough in printing technology that raises the Stylus 800 into a class of its own. The Stylus 800 prints the sharpest, clearest images ever formed by a personal ink jet. Better than *any* personal thermal ink jet. And no other personal ink jet does it at a lower cost per page than the Epson Stylus 800*.

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For dealer referral or warranty details, call 800-BUY-EPSON (800-289-3776). In Canada, call (800)GO-EPSON. For Latin America, 305-265-0092.

Top of the News

Continued from page 85

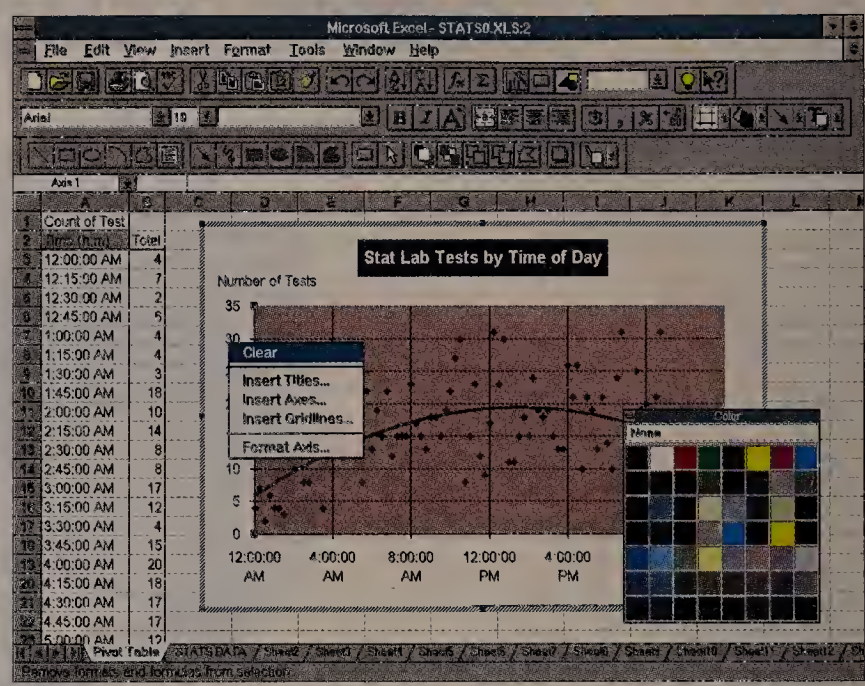
can now edit charts on the worksheet without having to go to a chart window.

In addition to these obvious changes, innumerable improvements at the keypress and mouse-click levels make the program easier to intuit. As in 1-2-3 release 4.0, you can edit cell entries "in place" without having to look at the formula bar. And the auto-fill feature is improved: In Excel 4.0, if you click the right mouse button, you're greeted with a pop-up menu where you can change the properties of an object; and the auto-fill handle lets you copy and fill cell entries. Release 5.0 combines these two concepts: Using the right mouse button with the auto-fill handle produces a pop-up menu that lets you select from among all of the alternatives.

Data Management Made Easy

Excel 5.0's most radical improvements are in the data management arena. I already mentioned the improvements in sorting, but there's a lot more.

Start with a Wizard that appears automatically when you open a text file, say a report you've captured off of your mainframe system. It displays a few lines of your data so you can see what you're doing, lets you drag symbols to indicate where to slice them into columns, and lets you specify, for instance, that everything in a particular column is a label or a date. You say you want automatic subtotals? Sort your list on a grouping field and then execute the command, and Excel creates an outline, inserts subtotal formulas, and neatly summarizes the data. For selecting a subset of records in a list, the old system of database, criteria, and extract ranges is replaced by in-place filtering. On command (the old system is still there, however, in case you need it), Excel identifies and selects your table of data and displays a scroll button beside each field name. Click a button, and Excel lists the unique values for that field. Click a value, and it displays only the rows of records that match your selection. Q+E, the vintage querying tool bundled with release 4.0, has been replaced with Microsoft Query, an Access look-alike that lets you tap into external databases, perform relational operations, select fields and records, and paste or link the results back into your spreadsheet.



EDIT EXCEL 5.0 CHARTS ON YOUR WORKSHEET, and use the curve-fitting and color palettes to make them look sharp.

But Excel 5.0's crown jewel is its new PivotTable, an updated version of 4.0's Crosstab. PivotTable allows you to summarize your data in categories, say total sales by product and region. Functionally, it's similar to Quattro Pro's Data Modeling Desktop, but PivotTable provides greater flexibility, and because it's integrated into the program, it's less cumbersome.

The PivotTable Wizard allows you to drag field headings to lay out the row and column headings, and the completed PivotTable is interactive, so you can quickly reorganize it to look for patterns in the data; for instance, you can alter the structure of the table by simply dragging the field headings into a new position. In addition, you can change the statistic used for calculations, alter the numeric format of the table values, and display such useful calculations as cumulative sums and column or row differences. In short, PivotTables enable you to quickly slice, dice, and rearrange your data virtually any way you want.

EXCELlent Excel Just About Has It All

● Yes
○ No

Standard features	1-2-3 for Windows release 4.0	Quattro Pro for Windows 5.0	Excel 4.0	Excel 5.0
List price	$495	$99.95	$495	$495
Disk space required	15MB	20MB	10MB	17MB
In-cell editing	●	○	○	●
Automated multiworksheet consolidation	○	●	●	●
Automated what-if version management	●	●[1]	●[1]	●[1]
Outliner	○	○	●	●
Rich Text Format	○	○	○	●
Drawing layer	●	○	●	●
3-D multipage worksheets	●	●	○	●
In-place chart editing	●	●	○	●
Interactive data modeling tool	○	●	○	●
Automatic subtotals	○	○	○	●
OLE 2.0 capable	○	○	○	●
Array formulas	○	●	●	●
Mail enabled	●	●	●	●
Slide shows	○	●	●[2]	●[2]

[1] Lacks multilevel organization of scenarios [2] Lacks light table

It's Visual! It's Basic! It's a New Macro Language!

Most people who love Excel 4.0 hate its idiosyncratic macro language—especially experienced programmers who are comfortable with conventional languages like BASIC. For these folks, the big news in release 5.0 is Visual Basic for Applications (VBA), which lets them use their hard-won skills to create Excel applications. Microsoft's strategy is to popularize application development by installing the same VBA language syntax in all of its applications as well as in its Visual Basic programming language. The touchy task of creating customized dialog boxes has been made a lot easier with special workbook pages designed expressly for editing them, and "properties" to link them to your macro procedures.

But it's not just programmers who benefit from VBA: Because VBA actions are expressed in step-by-step, quasi-English commands, they are easier to understand and emulate than Excel 4.0's arcane function-based statements. In response to Quattro Pro for Windows, Excel 5.0 also provides some new features for customizing worksheets without using macros. You can draw standard Windows controls right on the worksheet and hook them to cell values (or macro procedures), and then you (and your minions) can operate the worksheet with your own custom controls.

"Quibbles aside, version 5.0 is simply the best Excel ever, and the best spreadsheet on the market."

Now for the Bad News

Of course, it's not all roses—this is software, for heaven's sake! For example, there's the Bloat Factor: A default installation of this program requires 15MB of disk space. Then there's the inevitable frustration that arises when the program falls short of the expectations it raises with all these new features. For instance, Excel's Function Wizard is a terrific tool, but still doesn't volunteer the fact that the function for calculating a loan payment requires the principal amount be a negative present value.

But quibbles aside, version 5.0 is simply the best Excel ever, and the best spreadsheet on the market today. I can't wait until tomorrow.

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.*

Excel 5.0

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Availability: December

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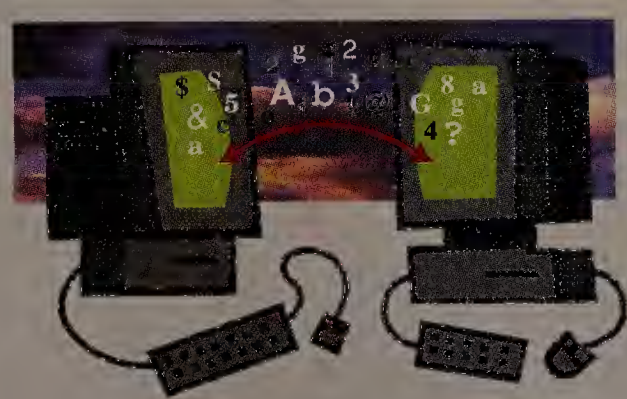
Document Portability for Windows?

Electronic documents don't travel well. If you E-mail a marketing proposal you created in Ami Pro, there's no guarantee the recipient will be able to read it—unless he or she is running Ami Pro too. Of course, you could always save the proposal as ASCII text, but you would have to sacrifice fonts, formatting, and any nontext elements. Adobe Systems' solution to this dilemma is Acrobat, software that lets you create fully formatted documents that other Acrobat users can read.



Despite the positive response to Acrobat, Microsoft believes document portability should reside in the operating system. "We're looking at what three companies—Farallon, ElseWare Corporation, and Ares Software—have to offer for document portability," concedes Dennis Adler, Group Program Manager of Microsoft's Personal Services Unit. "But technology to simulate fonts has its limitations—it takes up memory and hard disk space—so we have to consider what users really want."

Translation: Expect document portability—probably in the next version of Windows. But whose solution will Microsoft adopt?

Not Adobe's. Adobe and Microsoft are rivals; and Acrobat is based on PostScript, while Microsoft backs TrueType font technology, which is built into Windows 3.1. Farallon, though, is a likely candidate. Its Replica for Windows takes an approach that's similar to Acrobat's and allows embedding of TrueType fonts. On the downside, it doesn't let you embed PostScript fonts.

Meanwhile, ElseWare and Ares concentrate solely on the fonts. ElseWare's Infinifont technology examines Panose information—numbers tucked into most TrueType fonts—to generate fonts on the fly. The Infinifont engine can spit out hundreds of typefaces with remarkable fidelity, and its font database can match 2500 more—including Adobe's most popular PostScript typefaces.

Ares's FontChameleon is actually one master typeface, but it performs algorithmic magic to mimic thousands of others. As with Infinifont, compression is built in, font fidelity is excellent, and the viewed document is fully editable. Of course, you'll need some other program in which to view the document: FontChameleon and Infinifont are strictly add-ons to an application or operating system.

So who emerges victorious from this document donnybrook? Smart money is on Microsoft's Seattle neighbor ElseWare, since Microsoft has already incorporated the smaller company's Panose standard into its font products and into Windows NT.

GORDON STUDER

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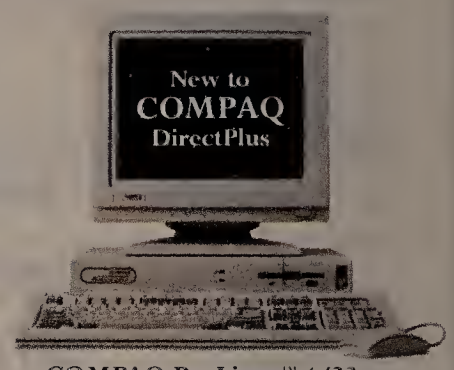

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intel inside

LTE Lite Features

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How To Protect Yourself, Your Family & Your Money, And Save A Bundle On Legal Fees With "The Desktop Lawyer" Software Program...Over 300 Ready To Use Documents At Your Fingertips!

Dear Friend,

Getting agreements in writing protects you, your family and your entrepreneurial activities. You know we live in a litigation-happy society. Also, everybody seems to have "selective memory" when it comes to friendly, handshake agreements. But paying a lawyer every time you need some kind of written agreement isn't very practical. (It's irritating, too, to pay him or her $100 to $300 "an hour" when you know a $9 an hour secretary is doing the work.) Well, even though I'm a lawyer, I've solved this problem.

You may be tempted to stop reading now. After all, "protection" isn't very exciting. But the first time you HAVE TO deal with a lawyer or respond to a lawsuit, nothing is as irritating, depressing, time-wasting and money-sucking as a legal problem. You'll remember this announcement then and kick yourself black- and-blue for not paying more attention. On the other hand, read this and you can deprive a lawyer of his boat payment - doesn't that sound like fun?!

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7 Important Reasons To Put "The Desktop Lawyer" To Work For You - Now!

#1: The IRS requires accurate documentation to support loans from your business to you or vice versa, and to justify all sorts of tax deductions. Failing to have the right document on file could leave you bloodied and broke after an audit. Having it in place may stop questioning in its tracks.

#2: Most misunderstandings between family, friends, partners and business associates occur because there is no written record of what everybody agreed to. Prevent ugly arguments, hard feelings, and even costly lawsuits.

Attention: Home-Based Business Owners & Other Entrepreneurs - Why Risk Losing Everything You're Working For To Some "Dumb" Mistake!

#3: Guard your business' assets and profits. If you're an entrepreneur like me, even if you are starting out with a small, home-based business, you have all sorts of valuable things to protect - inventions, ideas, copyrights, and confidentiality agreements. You may need employment forms, non-compete agreements, even termination forms (to prevent ex-employees' lawsuits). You may also need leases, sales agreements, loan documents, credit and collection forms and letters, joint venture agreements. There are even documents that will MAKE money for you by negotiating better prices or terms, reducing costs, and more. Go to a lawyer for all this - you'll spend a fortune and wait for days or weeks to get what you need. Turn your computer into your lawyer, save a bundle, and get what you need NOW.

Is Your Corporate Shield Made Of Swiss Cheese?

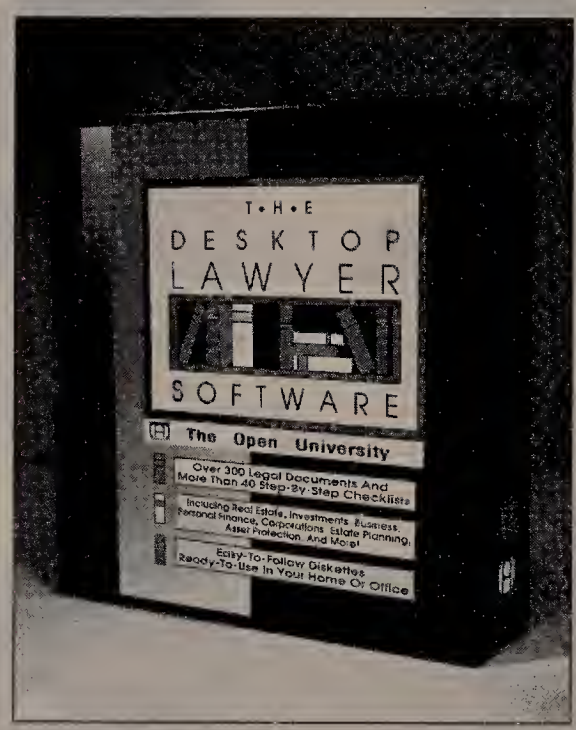
#4: If you form your own corporation but fail to keep its documents in order, your "corporate shield" can easily be pierced, and your personal assets attached...your house, car, savings accounts, even your little son's or daughter's Christmas Club account becomes fair game! There's no easier way to avoid all that risk than using "The Desktop Lawyer". Having your own corporation, even for a very small business, can give you unbelievable tax benefits and savings. "The Desktop Lawyer" gives you all the documents you'll need for incorporating.

"I'll Never Speak To You Again!"

#5: Even family life can be complicated these days-Real Estate, Land Contracts, Loans among family members, Living Wills, Trusts and more. Every agreement and form for all these purposes is included and explained in "The Desktop Lawyer" too... including 9 documents for Wills, 18 documents for Investments and Loans, 10 on Trusts, even Pre-Nuptials!

How Many Ways Can You Lose Money In Real Estate Anyway?

#6: I own office buildings and rental properties. Maybe you do, too, or will in the future. Well, look out! It sure sounds easy on late-night TV. But in real life, you can get clobbered 50 different ways to Sunday just by making "little mistakes" in paperwork. So, I've included Options, Rentals, Leases, Land Contracts, Construction, Real Estate Closings, Land Trusts, Trust Deeds, Promissory Notes - 33 key real estate documents and instructions.



What About Making Money At Home With Your Computer?

#7: A lot of people are making very good money these days just with "document preparation" using their computers. (There are books in bookstores about this.) If this interests you, you couldn't get a better "helper" than my "Desktop Lawyer". Just doing a document here and there for a friend or co-worker, at a fraction of the lawyer's fees, could put hundreds, even thousands of dollars in your pocket. But if money saved is money earned (and it is!), then the money you'll keep in your pocket, away from the lawyers, is going to add up to thousands and thousands of dollars. No, I'm not saying you'll NEVER need to consult a lawyer again, but why feed the sharks when you don't have to?

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Sincerely,

Laurence J. Pino, Esq.
President & Founder, The Open University

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Circle 83 on reader service card

MS-DOS 6.2: DoubleGuard for DoubleSpace

TEST DRIVE ▶ Didn't Microsoft introduce DOS 6.0 just a few months ago? Yes, and several million copies later, the program has proven to be Microsoft's most successful—and controversial—DOS upgrade to date.

While DOS 6.0 broke new ground by adding utilities such as file compression, memory management, and virus protection, not everyone was pleased with the new features. Some users complained that DOS 6.0's DoubleSpace compression utility damaged their hard drives, causing system crashes and lost data.

While Microsoft denied that 6.0 had any major bugs, it wasted little time in introducing a more polished version. DOS 6.2 fixes many of DoubleSpace's shortcomings and adds a few features, including ScanDisk, a disk test and repair utility.

Not surprisingly, DoubleSpace is the most improved utility in MS-DOS 6.2. Enhancements include DoubleGuard, a data protection feature that checks for code and data corruption in RAM used by DoubleSpace. If DoubleGuard spots a problem, it pops up an error message and stops the system to limit further corruption. DoubleSpace now requires less RAM (down from 43K to between 33K and 37K) and resides partly in upper memory, freeing more RAM below 640K for other programs and data.

One significant improvement is an easy-to-use uncompress tool for converting compressed DoubleSpace files to their original state. Select *Uninstall* from DoubleSpace's menu-driven interface, and it automatically uncompresses the selected drive. Using a prerelease version of MS-DOS 6.2, I compressed and uncompressed a 300MB hard drive with DoubleSpace and encountered no problems. (Before it was uncompressed, my drive had 480MB of total space, with a 1 to 1.7 compression ratio.) But Microsoft should develop a Windows interface for its DoubleSpace program. Currently you must exit Windows to run it.

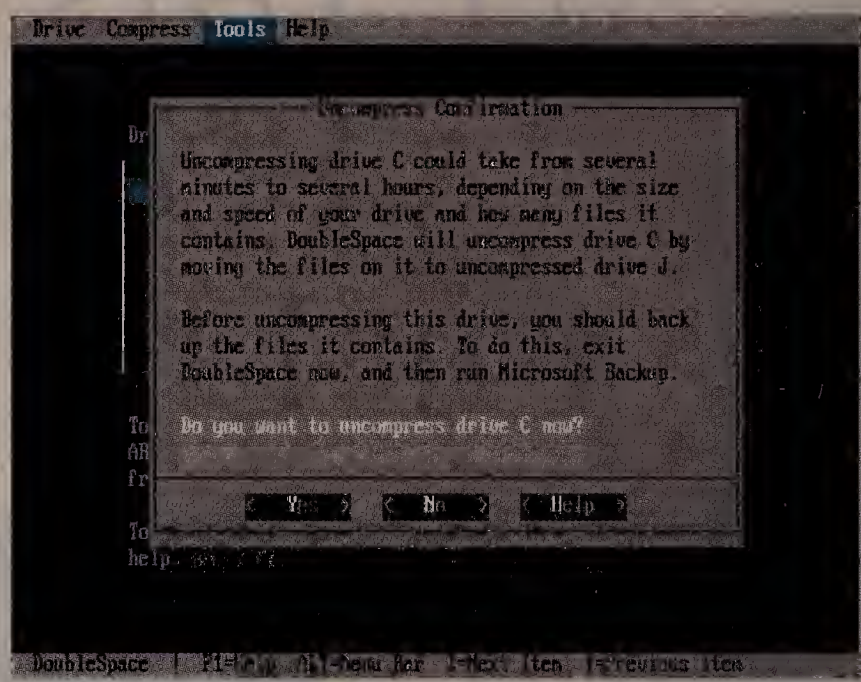
DOS 6.2 also features ScanDisk, a new utility that diagnoses and fixes DoubleSpace and uncompressed disks, including floppies. ScanDisk will scan your hard drive for bad sectors; if it finds one, this utility marks the spot and moves your data to a good sector.

Other version 6.2 refinements help boost system performance and give you more control over DOS. For instance, DOS's SmartDrive disk cache now supports CD ROM drives—an important feature for multimedia PCs. And an enhanced "interactive" startup option lets you run AUTOEXEC.BAT commands selectively, a handy feature when a troublesome command keeps your system from booting. (MS-DOS 6.0 offered this feature for CONFIG.SYS only.)

Other enhancements are long overdue. DOS's DIR, MEM, CHKDSK, and FORMAT now display numbers greater than 1000 with commas—making it easier to determine available disk space on 200MB-plus hard drives. DISKCOPY, by using the hard drive as storage space, now makes floppy-to-floppy copies without the need for multiple disk swaps. And the MOVE, COPY, and XCOPY commands now warn you before copying a file over another file with the same name.

MS-DOS 6.2 isn't a vast improvement over DOS 6.0; rather it's a series of enhancements that collectively produce a better operating system. Should you upgrade? If you're a DOS 6.0 DoubleSpace user, Version 6.2's improved file compression and ScanDisk utilities would definitely be worth the upgrade price—a mere $9.95. If you're a DOS 5.0 user, however, a good utilities package may serve your needs just as well. Other options include IBM's PC-DOS 6.1 or Novell's DOS 7.0, both of which offer software utilities that rival those in MS-DOS 6.2.

—Jeff Bertolucci



UNCOMPRESSING A DRIVE is now as easy as compressing it, thanks to the new Uninstall command in DoubleSpace.

Enhancements in MS-DOS 6.2

DoubleGuard
Checks RAM used by DoubleSpace for code and data errors.

Uncompress
A new uncompress tool easily converts DoubleSpace files to their original state.

ScanDisk
A new utility that diagnoses and repairs hard and floppy disks.

SmartDrive
DOS's SmartDrive disk cache now caches CD ROM drives.

DISKCOPY
DOS's DISKCOPY makes floppy-to-floppy copies without multiple disk swaps.

MS-DOS 6.2

Microsoft's latest version of DOS fixes some 6.0 shortcomings and offers new tricks.
Key Features: DoubleGuard data protection • Enhanced DoubleSpace file compression • ScanDisk utility
Pricing: $9.95 upgrade from 6.0, $77.95 upgrade from 5.0 or earlier version
Availability: immediate
Microsoft, 800/426-9400, 206/882-8080
Reader service no. 815

How does everyone at Media Partners use Approach?

Jim Sullivan
Company Management

William Albritton
Sales Reporting

Adele Pevzner
Sales Contracts

Deborah Walsh
Contact Management

Lou Leta
Staff Scheduling

Gary Pink
Equipment Maintenance

Amy Canniff
VCR Library

Lisa Callary
Inventory Management

Linda Dietenhofer
Invoice/Accounts Receivable

Lauren Aborjaily
Production Contracts

Ellen Camloh
TV Script Library

Martha Hicks Leta
Video Clips

Laurie Gardella
Graphics Library

Bob Sullivan
Comic Book Database

IT'S NOT JUST THE COMPANY PHOTO. IT'S ALSO THE APPROACH DATABASE USER GROUP.

When Media Partners Inc., a cable TV advertising firm, was launched, General Manager Jim Sullivan was determined to streamline the entire operation by automating everything from order tracking and invoicing, to sales reporting to contact management. Even the message center.

NEW LOTUS APPROACH 2.1. THE RELATIONAL DATABASE EVERYONE CAN RELATE TO.

Jim knew he could do this because he knew about award-winning Lotus® Approach.™ Approach is so easy and so powerful that every one of his employees uses it. Every day. Even Jim's 12-year-old son, Bob, has developed an Approach database to manage his growing collector comic book business.

As an ex-software developer, Jim had the technical savvy to use any database out there. As a General Manager, he had the business savvy to choose Approach. Says Jim, "I've tried Access,™ Paradox® all the others. Nothing delivers the instant productivity we got with Approach." In fact, independent research shows that the average user is productive within two hours of opening the box.†

With Approach, you'll work with familiar desktop items like reports, forms, form letters and mailing labels. Approach requires no programming, and is 100% compatible with all popular databases and networks with no additional set up. And it offers seamless integration with all Lotus Windows™ applications, including 1-2-3.®

EXPERIENCE THE INSTANT PRODUCTIVITY OF LOTUS APPROACH FOR JUST $99.

Lotus Approach has won over 25 major industry awards and accolades, including *Windows Magazine's* 1993 Reader's Choice Award. And right now you can get it for just $99 (Reg. $395).* Call **1-800-TRADEUP, ext. 9253**** today or visit your Lotus Authorized Reseller to take advantage of this incredible offer.

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Market Probe International, New York, NY, February, 1993. *Plus shipping and handling if applicable. Offer good through 12/31/93. **In Canada call **1-800-GO-LOTUS.** ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus 1-2-3 and Working Together are registered trademarks of Lotus Development Corporation. Approach is a trademark of Approach Software Corporation, a wholly-owned subsidiary of Lotus Development Corporation. Microsoft is a registered trademark and Access and Windows are trademarks of Microsoft Corporation. Paradox is a registered trademark of Borland International Inc.

Lithium Ion Powers Color Subnote

TEST DRIVE ▶ Toshiba's latest collection of portable PCs includes the industry's first subnotebook with an active-matrix color screen. Also new is a 7-pound notebook with built-in audio and a large color display designed for on-the-road multimedia presentations.

Full-Featured Subnote

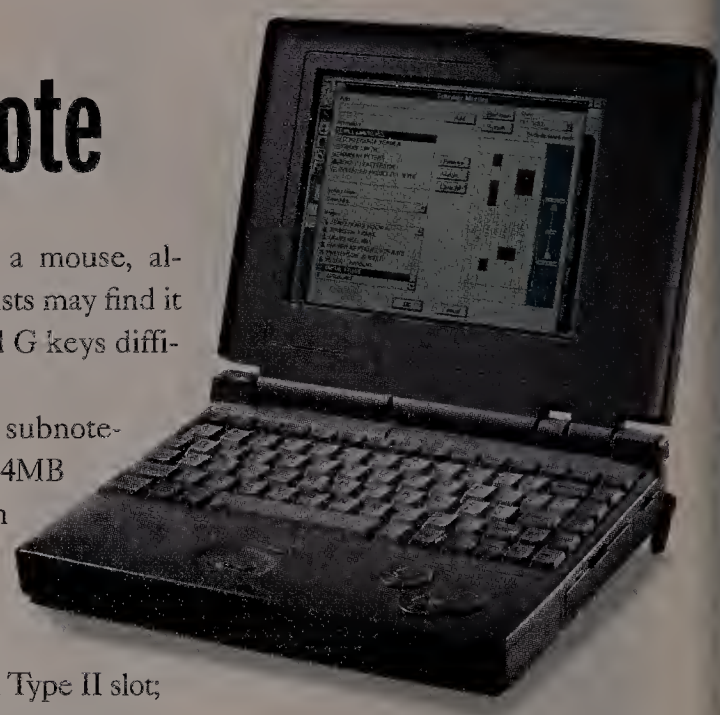
Toshiba's Portégé T3400 packs a lot of power into a small package. Driven by Intel's energy-saving 33-MHz, SL-enhanced 486SX processor, the Portégé includes VL local bus video and a graphics accelerator to speed Windows tasks. It's also the first portable to use a lithium-ion battery, which is lighter and offers a higher energy density than nickel-metal hydride batteries. Toshiba claims the color Portégé runs 3 to 6 hours between charges; the monochrome model runs 4 to 8 hours.

The Portégé's best feature is its optional active-matrix color display. Too often subnotes come with hard-to-read reflective screens; the Portégé's color VGA display is sure to please the most discriminating notebook user. But while this 7.8-inch display has excellent contrast and wide viewing angles, it's less bright than other active-matrix panels we've seen—a factor Toshiba attributes to the Portégé's power-saving design.

A more significant issue is price: The 4.4-pound color Portégé T3400CT is priced at $3999, while the 4.1-pound monochrome T3400 is considerably less at $2599. Toshiba officials attribute the color model's steep premium to the difficulty of manufacturing active-matrix panels; however, most monochrome subnotes sell for $2000 or less.

The Portégé's pointing device, the AccuPoint, is similar to the pointing stick on IBM's ThinkPad portables. The AccuPoint is located between the H and G keys, and the click-and-drag buttons are situated in front of the keyboard. We found the Accupoint to be a suitable replacement for a mouse, although some typists may find it makes the H and G keys difficult to reach.

Each T3400 subnotebook comes with 4MB of RAM, which can be upgraded to 20MB; a 120MB hard drive; a PCMCIA Type II slot; and an external floppy drive.



THE 4.4-POUND T3400CT has an active-matrix color display.

Multimedia Notebook

If you need a notebook for business presentations, consider Toshiba's T4700 series. These 7-pound notebooks feature Intel's new 3-volt SL 486DX2-50 processor, VESA local bus video, and built-in audio. Each has a 9.5-inch display: The T4700CT offers superior active-matrix color, and the T4700CS has an enhanced passive color screen. For motion video, Toshiba recommends the active-matrix T4700CT, which has a faster response time and displays video more smoothly than the passive display.

The T4700's audio capabilities include a built-in miniature microphone for recording voice messages easily. For higher-quality audio input, there's a jack for an external microphone. A small speaker beneath the keyboard plays sound files; however, audiophiles will want to connect external speakers to the T4700's speaker/headphone jack. The unit comes with a subset of Microsoft's Windows Sound System software, which supports 16-bit WAV audio files but not higher-quality 16-bit MIDI files.

The T4700 comes with 8MB of RAM, expandable to 24MB, a 200MB or 320MB hard drive, a 3½-inch internal floppy, and a Microsoft BallPoint mouse. If presentations are your passion, these high-end notebooks are well worth a look.

—Jeff Bertolucci

MULTIMEDIA NOTEBOOK: The T4700s include a color display and built-in audio.

JOHN GREENLEIGH

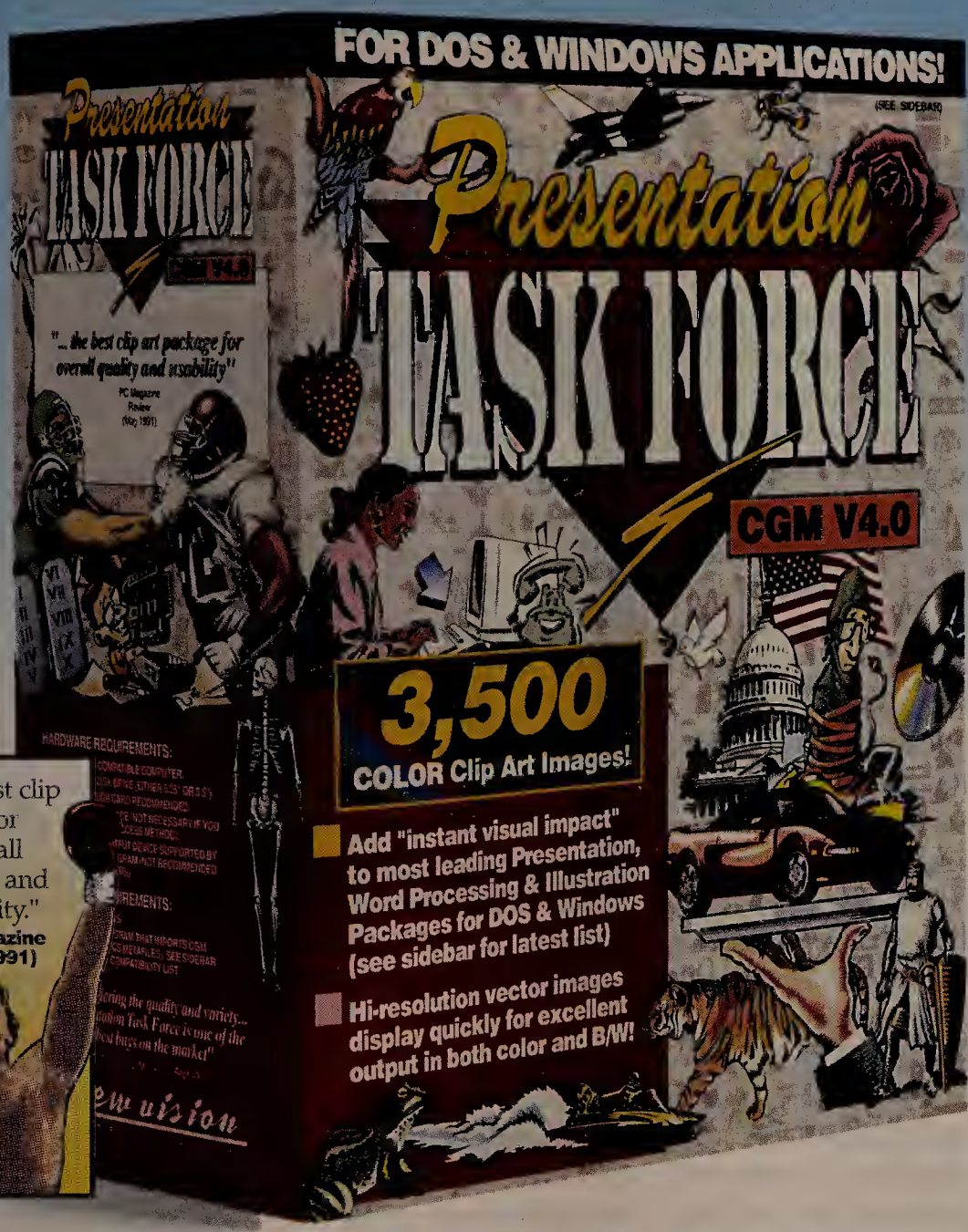
Portégé T3400, T3400CT

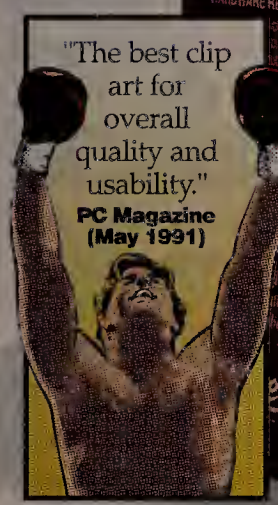
A subnotebook with an optional active-matrix color display and an integrated pointing device.
Pricing: $2599 (monochrome), $3999 (color)
Availability: Immediate
Reader service no. 816

T4700CS, T4700CT

A 7-pound notebook with a 9.5-inch passive or active-matrix color display.
Pricing: T4700CS with 200MB hard drive $4599, with 320MB hard drive $4999; T4700CT with 200MB hard drive $5299, with 320MB hard drive $5699
Availability: Immediate
Reader service no. 817

Toshiba America Information Systems, 800/334-3445, 714/583-3437 (fax)





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For quality and value, there are NO contenders!

If you're looking for a comprehensive collection of high quality clip art that can be used with over 60 DOS, Windows and OS/2 business applications (see sidebar) ... consider Presentation TASK FORCE 4.0.

PTF 4.0 is the ONLY clip art library to give you **3,500 full-color CGM images** in a MASSIVE, all-in-one collection. At only $199.00, PTF 4.0 is widely recognized as today's best clip art value. Smaller collections, with far fewer images can cost you hundreds (often thousands) of dollars more!

And that's not all! PTF 4.0 includes a **FREE "Color to B&W" Conversion Utility** ($59.00 value) that allows you to optimize PTF color files for dynamite-looking output on b&w printers.

Short on hard disk space? No problem. PTF images are uncompressed, and can be accessed directly from floppy disks. Install the complete collection, or any combination of individual image categories to your hard disk. You decide!

It's unanimous! Presentation Task Force 4.0 delivers a powerful one-two combination of both quality and value, making it the undisputed heavyweight champion of the clip art world.

"Outstanding value & excellent art to boot! ...by far the best value of all the clip art libraries we reviewed."

PC Computing (May 1992)

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Circle 177 on reader service card

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- FREELANCE GRAPHICS
- FREELANCE GRAPHICS FOR WINDOWS
- HARVARD DRAW
- HARVARD GRAPHICS 3.0
- HARVARD GRAPHICS FOR WINDOWS
- HIJAAK
- HIJAAK FOR WINDOWS
- HOLLYWOOD
- LOTUS 1-2-3
- MICROSOFT EXCEL 4.0
- MICROSOFT PUBLISHER
- MICROSOFT WORD FOR WINDOWS
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Multimedia Presentations With Charisma

TEST DRIVE Charisma 4.0 from Micrografx offers a smorgasbord of sound and video effects, enabling you to quickly create multimedia presentations with a sophistication that belies the program's ease of use.

Built on powerful new 32-bit graphics technology that debuted in Micrografx Designer version 4.0, it's a complete redesign of the previous version, 2.1. Everything we saw in the prerelease version of Charisma is optimized to add impact to your presentation.

Micrografx Charisma 4.0

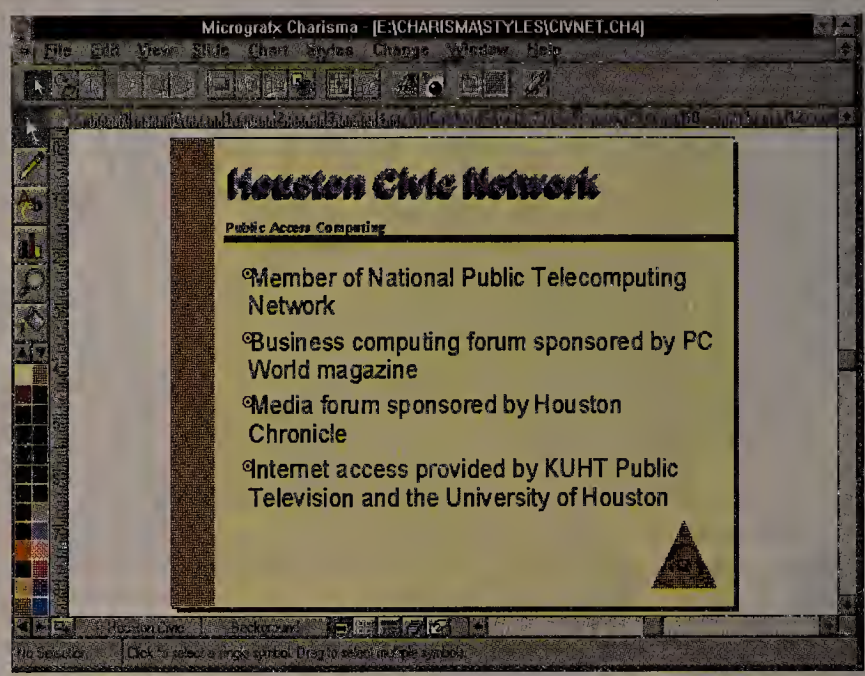
Business presentations get new multimedia features.
Key Features: Extensive collection of audiovisual clips • Improved text handling
Pricing: $495, upgrade from version 2.1 $149
Availability: Immediate
Micrografx Inc., 800/676-3110
Reader service no. 818

Charisma's biggest weakness shows in comparison with Harvard Graphics, which enables busy executives to squeeze out every second of productivity. Harvard's ease-of-use features —such as the 5-minute coach, advisor quick tips, customizable icon bar, and "quick look" dialog boxes—answer the quick-fix needs of harried users.

Using one of the program's 75 style sheets, you can customize any of the style's four elements: color scheme, text scheme, backgrounds, and layout templates. An auto-build feature lets you reveal elements such as bulleted items one at a time. A synchronization feature lets you bring multiple elements onto the screen simultaneously.

You now get 66 screen transitions, rather than the 25 of the previous version.

Text handling is improved in 4.0. You can import external ASCII or Rich Text Format files, flow text along a curved object, and check your spelling. You now get 84 chart types and a number of exciting special drawing effects, including drop shadows, warps, and 3-D extrusion of text and graphics. Another welcome improvement: You can print your presentation without having to remove background graphics first.



IMPROVED TEXT HANDLING AND STRONG MULTIMEDIA SUPPORT are two of the many enhancements Micrografx has made to Charisma 4.0.

Impressive as its updated features may be, Charisma stands out from the presentation pack because of the way it handles multimedia. Charisma includes a CD ROM with 7000 pieces of clip art; 200 photo images; 200 typefaces; 300 WAV sound effects; 250 MIDI files; and 50 video and animation clips. Charisma's Media Manager keeps track of it all, displaying thumbnails of the image and video files and playing the sound files. It's this type of management feature that is going to make multimedia desirable to business.

—Joe Abernathy

Notebooks: The Final Frontier

When the PC World Test Center staff joked among themselves about conducting our July notebook PC usability test on the Space Shuttle, they had no idea that NASA would ask them to do just that. Randy Morris and Sheryl Stealea, two usability engineers at Lockheed Engineering, recently asked them to test IBM's TrackPoint II and Microsoft's new Ballpoint Mouse II pointing devices in zero-gravity conditions.

The Test Center jetted to the Johnson Space Center in Houston, Texas, to assist in the test preparations. They modified the PC World Pointing Device Exercise™ used in the July notebook usability test (see "What's the Easiest Notebook to Use at 30,000 Feet?") to fit the simulated zero-gravity environment of NASA's KC-135 jet. NASA conducts experiments in the so-called vomit comet to prepare for space flights. The KC-135 is a flying padded cell that attains about 30 seconds of weightlessness during each of 40 arcs, or parabolas, per flight.

WEIGHTLESS TESTERS determine the best pointing device for use in space.

In past experiments, NASA found that most trackballs tend to float away from the sensors, causing pointing device errors.

Andy Klausman, NASA ThinkPad project manager for IBM Federal Systems in Houston, says "the KC-135 tests help ensure there aren't any surprises, like [astronauts] pushing away from the notebook when using the TrackPoint." While there was no firm commitment as of press time, *PC World*'s test may be used in an upcoming Shuttle mission.

—Dean Andrews and Thomas Grubb

PHOTO: BOB WALCK/NASA; ILLUSTRATION: GORDON STUDER

PCs Locate Missing Children:

A national nonprofit organization is successfully using cutting-edge PC technology to locate missing children. The National Center for Missing and Exploited Children, a clearinghouse of information on missing children that is based in Arlington, Virginia, uses imaging, communications, and database products donated by PC vendors to maintain and distribute its data. Prior to implementing modern PC technology in 1990, NCMEC located the missing children in about 10 percent of its cases. The success rate has jumped to about 80 percent thanks to the new technologies, according to Ernie Allen, president of NCMEC.

The NCMEC planned to take another step forward in November by installing its first OS/2-based multimedia kiosk, which will display images of missing children and offer interactive safety tips. The kiosk will be in Washington D.C.'s National airport. "The PC industry has fundamentally changed the way America looks for its missing children," Allen said. "We're showing that technology can be used to solve real, complex social problems."

PC Tools Overhauls Safety Features

TEST DRIVE ▶ In a world where more and more users are turning to Windows, and DOS comes with a host of useful little programs, utility vendors have had to redefine their products to stay competitive. Central Point, which has contributed programs to both MS-DOS 6.0 and IBM PC-DOS 6.1, is making its flagship PC Tools more tempting by adding features and removing obsolete ones. (This Test Drive is based on impressions of a prerelease copy of PC Tools Pro 9.0 for DOS.)

One useful addition, Central Point Recuperator, is a memory-resident program that saves everything in RAM to disk at user-determined intervals. If you crash, you can easily restore your entire work environment—including Windows with multiple applications and data files—to the way it was when Recuperator last saved it.

PC Tools Pro comes with the full version of Central Point Anti-Virus 2.1, offering more tricks for virus detection than before. The program looks for suspicious instructions, thereby catching as-yet-undiscovered viruses. And when Anti-Virus determines that a program file has been changed, it can use information from the original file to restore it.

Better Backup, Too

Central Point Backup has won several *PC World* Best Buys, and PC Tools Pro has made a few improvements to this well-regarded program: You can now select files and directories to include or exclude via a simple list, a one-step operation that combines two previous functions. And Backup can compare every file it backs up to the original—an extra precaution that many consider to be worth its serious performance hit.

SI Professional, the system information utility, has been transformed into a full-fledged, integrated diagnostic program.

And PC Tools Pro can optimize, analyze, and repair both Stacker- and DoubleSpace-compressed drives. Central Point is removing the desktop accessories—including the calendar program, macro processor, outliner, notepad, and database—from PC Tools. In addition, Central Point has dropped Commute, its remote communications program.

Not that users will be completely shut out from calendaring. The retail version of PC Tools Pro will come with a coupon for a free copy of Campbell Services' OnTime for DOS or Windows. If you upgrade from an older PC Tools, you won't get the free OnTime, but you'll be able to buy it at a reduced price.

Speaking of prices, Central Point is making sure that PC Tools Pro sells at bargain rates, at least for the remainder of 1993. Although the list price will remain at $179, dealers' cost will be considerably lower, and Central Point expects the strategy to produce street prices around $100. The $49.95 upgrade price will apply to competitive upgrades at least through the end of the year.

—Lincoln Spector

PC Tools Pro 9.0 for DOS

Utility collection adds more safety, takes out PIM tools.

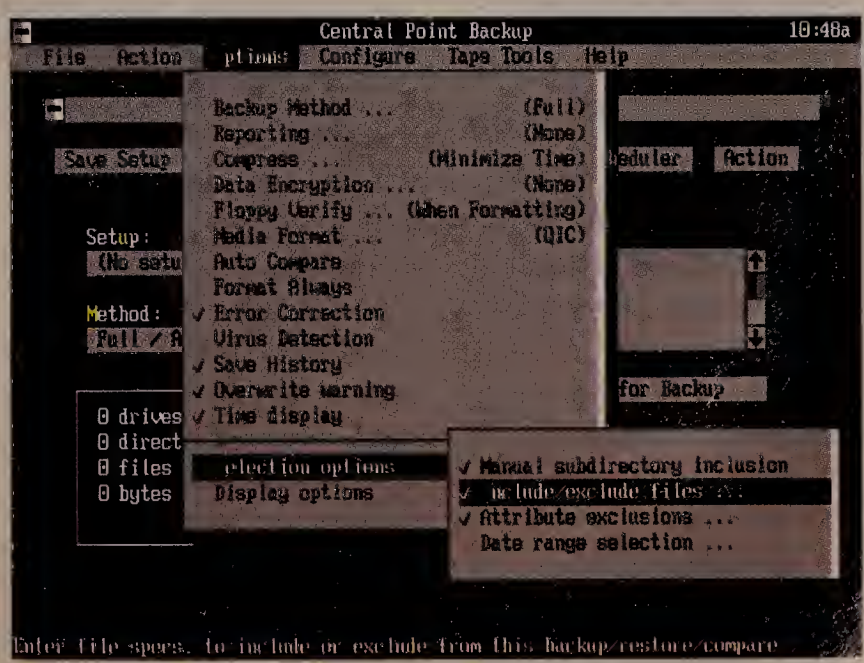
Key Features: Crash recovery • Improved Backup and Anti-Virus • Compressed-drive support • Complete diagnostics • PKZIP 2 support

Pricing: $179; upgrades $49.95, including competitive upgrades through the end of the year

Availability: Immediate

Central Point, 800/964-6896, 503/690-8090

Reader service no. 819



WHEN YOU NEED TO SELECT FILES for a backup, PC Tools Pro offers a new include/exclude option that puts all your choices in one place.

New Keyboards Comfort Your Hands

TEST DRIVE ▶ As a writer and editor, I really demand a lot of my computer keyboard. I limped along with a 386-16 and an 80MB hard drive for years, but after just a day with the unresponsive keyboard that came with my new 486, I was ready to throw it in the trash.

That's why I was particularly excited to get my hands on prototypes of two of the latest in a steady stream of alternative-design keyboards: The MyKey, by Ergonomixx of Leesburg, Virginia; and the ergoLogic 7.1, from ErgoLogie Enterprises of Vancouver, Canada (which will also be marketed as the FlexPro from Key Tronic of Spokane, Washington). Both keyboards have innovative designs that the developers claim are more comfortable than the traditional, flat keyboard. Neither company is saying its product will prevent repetitive strain injuries, given the lack of definitive testing.

The MyKey divides the keys in two sections, each angled slightly outward at about 10 degrees. It's not a radical departure from the flat design, but it felt comfortable and seemed to reduce wrist strain. The unit has a built-in palm rest, with a trackball located in the center. The rest is a nice idea but may present problems if you rest your wrists on its hard surface.

The MyKey does more, however, than adjust the angle of the keys. The first thing you'll notice is the clocklike arrangement of the function keys on the left side of the unit (<F12> is at the top of the circle, <F6> at the bottom, and so on). The design looks a little odd, but it was easy to get used to. Cursor keys are in the center of the function key layout.

I prefer a softer touch and found the clickiness of the MyKey distracting, although some users like that quality. The <Enter> and <Shift> keys in particular required a more forceful touch than the rest of the keys. According to Ergonomixx, though, the <Enter> and <Shift> key feel has been corrected with the shipping versions of the keyboard.

MyKey is scheduled to ship by the end of this year. It will sell for $275 and will be available through retail stores and from Ergonomixx. It comes with a one-year warranty and a 30-day money-back guarantee.

The ergoLogic and MyKey keyboards take different approaches to making typing more comfortable.

While the MyKey takes the fixed approach, the Key Tronic/ErgoLogic keyboard focuses on adjustability. Out of the box, the unit looks a lot like the standard flat design; but push the button at the top, and the keys split into two sections, which you can rotate out to as much as a 25-degree angle using a dial on the side of the keyboard.

A bar at the top of the keyboard identifies the precise angle: a nice feature, particularly in companies where more than one person uses a workstation. Once you've found a comfortable angle, you just note the degree for future reference.

The Key Tronic/ErgoLogic keyboard has some other nifty features as well: My favorite is the programmable <Space> bar, which splits into two sections and features what the companies call a HyperSpace design. You can press the <Space> bar in the usual way or—my preference—slip your thumb into a notched area underneath and simply move it horizontally.

The Key Tronic/ErgoLogic keyboard includes adjustable wrist/palm supports located along a track built in to the front of the keyboard. You can adjust their location along the track and the height of the supports.

Both ErgoLogic and Key Tronic will sell the keyboard for $399 as the ergoLogic and the FlexPro, respectively. Key Tronic and ErgoLogic will offer a one-year warranty on the keyboard. Both companies expect to begin shipping by the end of first quarter 1994.

I found the learning curve surprisingly short with both designs. Better typists should have an even easier time regaining their normal typing speed.

—Roberta Furger

ergoLogic/FlexPro

The new keyboard splits into two sections, whose angle can be adjusted for comfort.
ergoLogic/FlexPro
Key Features: HyperSpace <Space> bar design • Adjustable angled split keyboard • Wrist/palm supports
Pricing: ergoLogic/FlexPro $399
Availability: March 1994
ErgoLogic Enterprises, 800/665-9929; Key Tronic, 800/262-6006
Reader service no. 820

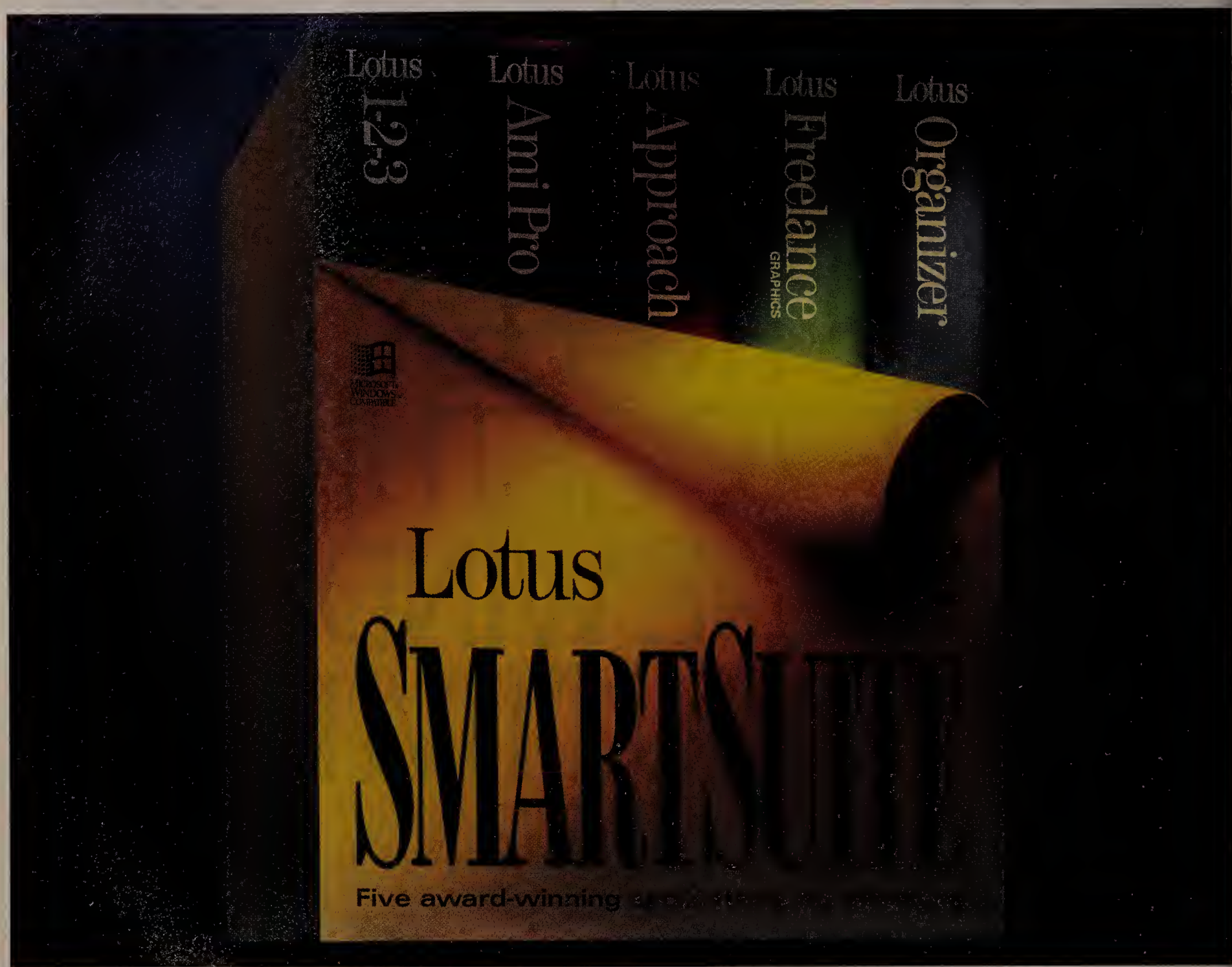
MyKey

The new design divides the keyboard into two sections and features innovative function-key placement.
Key Features: 10-degree angled split keyboard • Clock-dial function key arrangement • Palm rests • Trackball
Pricing: $275
Availability: Immediate
Ergonomixx, 703/771-1047
Reader service no. 821

JOHN GREENLEIGH

SOFTWARE INDUSTRY LEADERS COME TOGETHER TO REDEFINE WINDOWS PRODUCTIVITY.

MEET THEM



LOTUS SMARTSUITE. $299.

By bringing together five industry leading applications in one high-powered, highly integrated suite, Lotus SmartSuite™ has redefined the future of the Windows™ platform.

It starts with Lotus® 1-2-3® Release 4, rated the most powerful, most usable Windows spreadsheet ever by virtually all industry reviewers.

It also includes Lotus Ami Pro® Release 3.01, consistently ranked the number one word processor in industry ratings over both Word and WordPerfect.®

Along with Lotus Freelance Graphics® 2.01, the world's easiest, most popular, best selling presentation graphics software.

As well as Lotus Approach,™ called the "most usable Windows relational database ever."

And unlike any competitive package, SmartSuite includes a very useful and popular personal information manager to help you plan and schedule. The multi-award winning Lotus Organizer.™

But simply to call SmartSuite a

IN OUR SUITE.

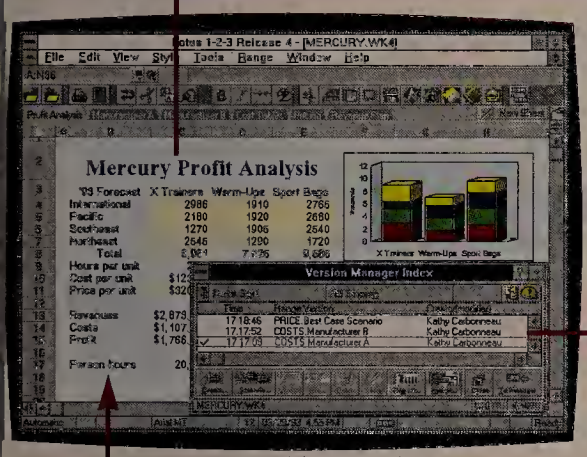
gathering of five leading Windows applications would be to miss the big story.

ALL TOGETHER NOW.

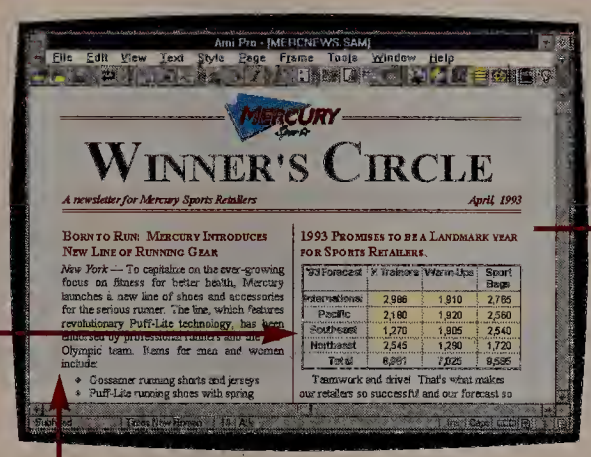
The five applications in SmartSuite also set new standards for integration. (Our leading competitor boasts that its spreadsheet, word processor and presentation software will have some consistency too . . . when the new releases are ready.)

Lotus also leads the way for sharing information across applications and using functions from one application while working in another. This goes beyond basic OLE and DDE through a feature called Collect and Copy that automatically forms links between applications.

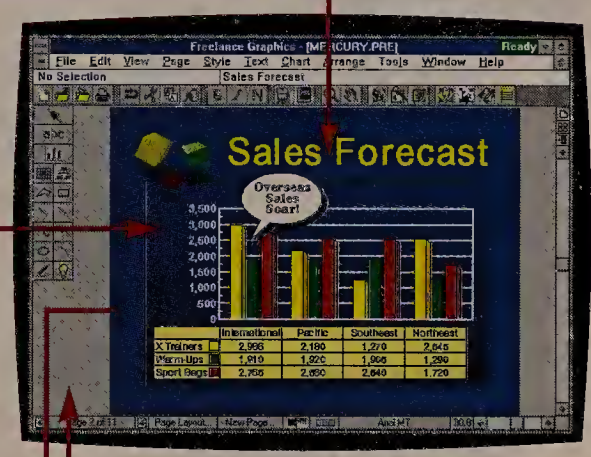
With a single mouse click you can easily edit 1-2-3 charts from within Freelance Graphics. You can seamlessly perform a mailmerge in Ami Pro with data from Approach.



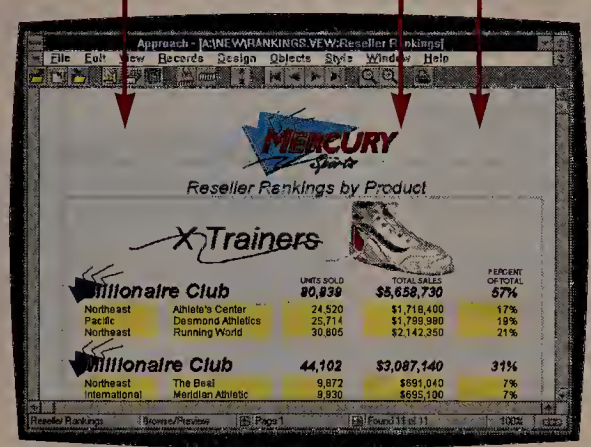
A 1-2-3 spreadsheet created with data from the Approach database.



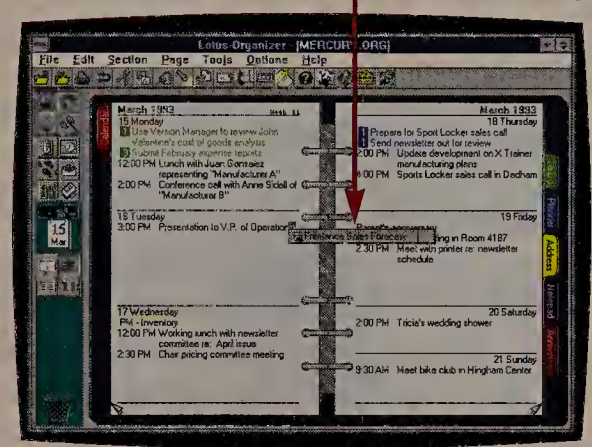
A table, taken from 1-2-3, easily inserted into an AMI PRO newsletter.



A FREELANCE GRAPHICS presentation made from an Ami Pro outline, including charts from 1-2-3.



APPROACH lets you manage the data you use in your other SmartSuite applications, especially 1-2-3.



A Freelance Graphics presentation is linked to a meeting scheduled in ORGANIZER.

First, to make it all easier and reduce training costs, they offer consistent appearance and behavior between applications. For example, SmartSuite applications share common menus, Live Status Bars and SmartIcons.® In fact, 1-2-3, Ami Pro and Freelance Graphics share 26 common SmartIcons.

The Application Manager displays all five application icons. Just point and click on an icon in the Application Manager to launch or switch into a new application.

Or link a Freelance presentation to a meeting agenda in Organizer. For more information on SmartSuite and this special $299 offer, just turn the page.

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> PC/Letter, 6/7/93

Lotus has not only eliminated the boundaries between Windows applications, it's led the way in eliminating the boundaries between people, by making it easier to work together in groups.

Because of Lotus's early commitment to the development of workgroup technology, SmartSuite stands significantly ahead of the pack in helping people to work together more efficiently. No one can match the collaborative computing technology that makes 1-2-3's Version Manager™ the standard for tracking and sharing information. And no mail-enabled "networking" versions come close to the scope of SmartSuite's Working Together® features.

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> Soft* Letter, 5/21/93

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> Wall Street Journal, 7/29/93

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Top-Performing Color Notebooks on a Budget

Two new notebooks offer a taste of luxury at budget prices. Austin Computer's 486 DX2-66 raises the performance bar for top-of-the-line active-matrix color machines, and Texas Instruments' TravelMate 4000E 486 WinSX/25 MHz adds a more affordable color model to TI's acclaimed notebook series.

Austin's Active Color Note

At $4499, the Austin 486 DX2-66 is hundreds of dollars cheaper than the handful of DX2-66 active-matrix color machines that have staked out this high ground—and it is configured more generously. In addition to its fast 66-MHz 486DX2 processor, the Austin packs the power of these features: VESA local bus video, a 340MB hard drive, an active-matrix color LCD display, 8MB of RAM, and a PCMCIA Type III slot. Weighing in at 6.3 pounds, the Austin measures roughly 11 by 8½ by 2 inches and, according to the vendor, achieves a battery life of 2 to 3 hours with its nickel-cadmium/nickel--metal-hydride battery pack. It has a convenient built-in 16mm trackball positioned in front of the <Space> bar, which is a nice implementation of the micro roller ball (although I work faster using the Microsoft snap-on trackball bundled with TI, Toshiba, and other notebooks).

Hard drive options include 130MB, 213MB, and 340MB models. The machine accepts two PCMCIA Type II devices or one Type III device, allowing you to use credit-card–size memory, communications, storage, and network adapters. Be warned, however, that although PCMCIA is the wave of the future, it is currently plagued by a host of problems concerning power consumption, compatibility, and availability (in other words, expect high prices).

The Austin 486 DX2-66 has the capability to drive an external VGA monitor for presentations and includes DOS 6.0 and Windows 3.1. Options include a fax-modem, a docking station, an external battery charger, and a car adapter.

TI's Bargain Color Note

If you're looking for a color notebook for less, Texas Instruments' TravelMate 4000E 486 WinSX/25 MHz features an enhanced passive-matrix color screen and sells for around $2200 on the street. TI's enhanced color display is an improvement over previous passive models we've used, achieving perhaps 80 percent of the clarity and brightness of active-matrix color.

Weighing just 6 pounds, the TI measures roughly 11 by 8½ by 2 inches. It has a standard 640-by-480 VGA screen and can simultaneously drive an external VGA monitor. TI has taken a number of steps to improve video performance, but the unit lacks the local bus Windows accelerator found in the Austin 486 DX2-66. One nagging problem with this and every other TravelMate is the flimsy plastic cover for expansion ports, which must be handled delicately.

In a word, the reason you would buy a TI rather than another notebook is *keyboard*. The 4000E has a generous 4mm key travel rivaling that of many desktop keyboards—this makes it my favorite. This kind of intelligent design extends into the machine itself. The TI ekes out 3 to 5 hours of battery life, which surpasses most other similarly configured color notebooks, according to the company.

The TravelMate features a 120MB hard drive and 4MB of RAM, expandable to 20MB. It uses the new hot-pluggable version of Microsoft's snap-on trackball—my favorite notebook pointing device. The unit includes parallel and serial expansion ports and an adapter for an optional numeric keypad. Other options include ethernet, SCSI, and token-ring adapters, and fax-modems.

Software includes DOS 6.0, Windows 3.1, and a suite of notebook utilities including Change Cursor, which gives Windows users a large, customizable cursor (Windows' default cursor is easily lost on matrix screens). If you're looking for a color notebook on a budget, the TravelMate 4000E is a worthy choice.

—Joe Abernathy

LOW-COST COLOR NOTE: TI's new TravelMate has an enhanced passive-matrix color screen; street-price about $2200.

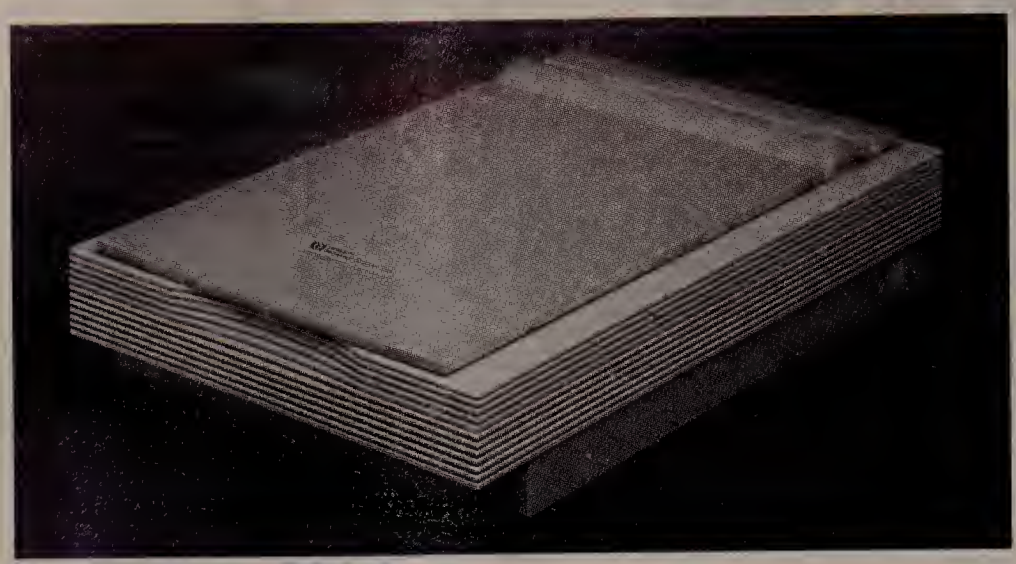
Austin Computer 486 DX2-66, Texas Instruments TravelMate 4000E 486 WinSX/25 MHz

Two new 486 color notebooks offer high-end features at low prices.

Austin Computer
800/752-1577
List price: $4499
Reader service no. 699

Texas Instruments
800/527-3500
List price: $2499
Reader service no. 700

HP Unleashes Price-Busting Color Scanner: The ScanJet IIcx



MORE RESOLUTION FOR LESS: HEWLETT-PACKARD'S $1179 color ScanJet IICX is 25 percent cheaper than its predecessor and boasts 400 by 800 dpi.

Hewlett-Packard's ScanJet IIcx looks like a winner right out of the starting gate. At just $1179, it's 25 percent cheaper than its predecessor, the ScanJet IIc, and hundreds of dollars less than its competitors. In fact, this single-pass, 24-bit color, 400-by-800-dot-per-inch scanner is priced more in the range of the 300-by-300-dpi scanners that are currently on the market.

HP didn't simply repackage the aging ScanJet IIc, either. In addition to the IIcx's amazingly low price, HP claims speed improvements of up to 50 percent—attained by quadrupling the buffer size to 256K, boosting the PC interface card's transfer rate to 1.1MB per second, and speeding up the scanning mechanism. A typical gray-scale scan of an 8½-by-11-inch document at 300 dpi now takes 8 seconds, as opposed to the IIc's 15 seconds, according to a company official.

Using software interpolation, the IIcx can achieve 1600-by-1600-dpi resolution, twice that of the IIc. And a suite of new drivers automatically finds the appropriate I/O address to simplify the installation of the ScanJet. Moreover, an optional unit for scanning transparencies, which will list for $759, will be available in January 1994.

The ScanJet IIcx comes bundled with Aldus's stripped-down OEM version of its image-editing software, PhotoStyler SE, as well as HP's own DeskScan II 2.0 scanning software. The unit also supports the TWAIN interface standard.

HP has enhanced its AccuPage OCR software driver to accommodate users of compatible optical character recognition programs, such as Calera WordScan Plus and Caere's OmniPage Professional. AccuPage 2.0 enables optical character recognition software to read fonts that are as small as four points and to obtain a higher-quality scan of documents containing both text and images.

—Anita Hamilton

ScanJet IIcx

You can't go wrong with this fast, economical 400-dpi color scanner.
Hewlett-Packard
800/722-6538,
800/333-1917 (fax)
List price: $1179
Reader service no. 701

DEC Gets Aggressive With Low-Cost Value Line

Digital Equipment continues its push into the low-end PC market with its new LP Value Line series. This family offers a range of processor and graphics options, with prices starting at $1448 for a 25-MHz 486SX PC with a color monitor. That's low enough to compete with bargain 486 PCs from other top vendors, including IBM. DEC's Value Line machines also come with a three-year warranty—one of the best support packages around.

The Value Line includes the slim-line LPv and the larger LPx models. The LPv line offers proprietary local bus video, three open ISA slots, and three open drive bays. Unlike the pricier LPx models, the LPv units aren't upgradable to Intel's planned Pentium OverDrive chip. However, you can upgrade the LPv 425SX, 433SX, and 433DX models to a 486DX2-66 model.

The LPx systems feature VESA local bus graphics. Each LPx model has plenty of room for expansion, including a ZIF socket for the Pentium OverDrive, four open ISA slots, two open VL-bus slots, and four open drive bays. Prices start at $1698 for the LPx 433SX with a 14-inch super-VGA noninterlaced monitor.

The LPx graphics subsystem is controlled by the same S3 805 graphics accelerator found in the LPv line. The S3 805 should provide plenty of power for typical business apps. However, you can choose either S3's 928 graphics chip (add $150) or Weitek's Power9000 chip (add $475). Digital recommends the S3 928 for desktop publishing and the Weitek chip for CAD applications.

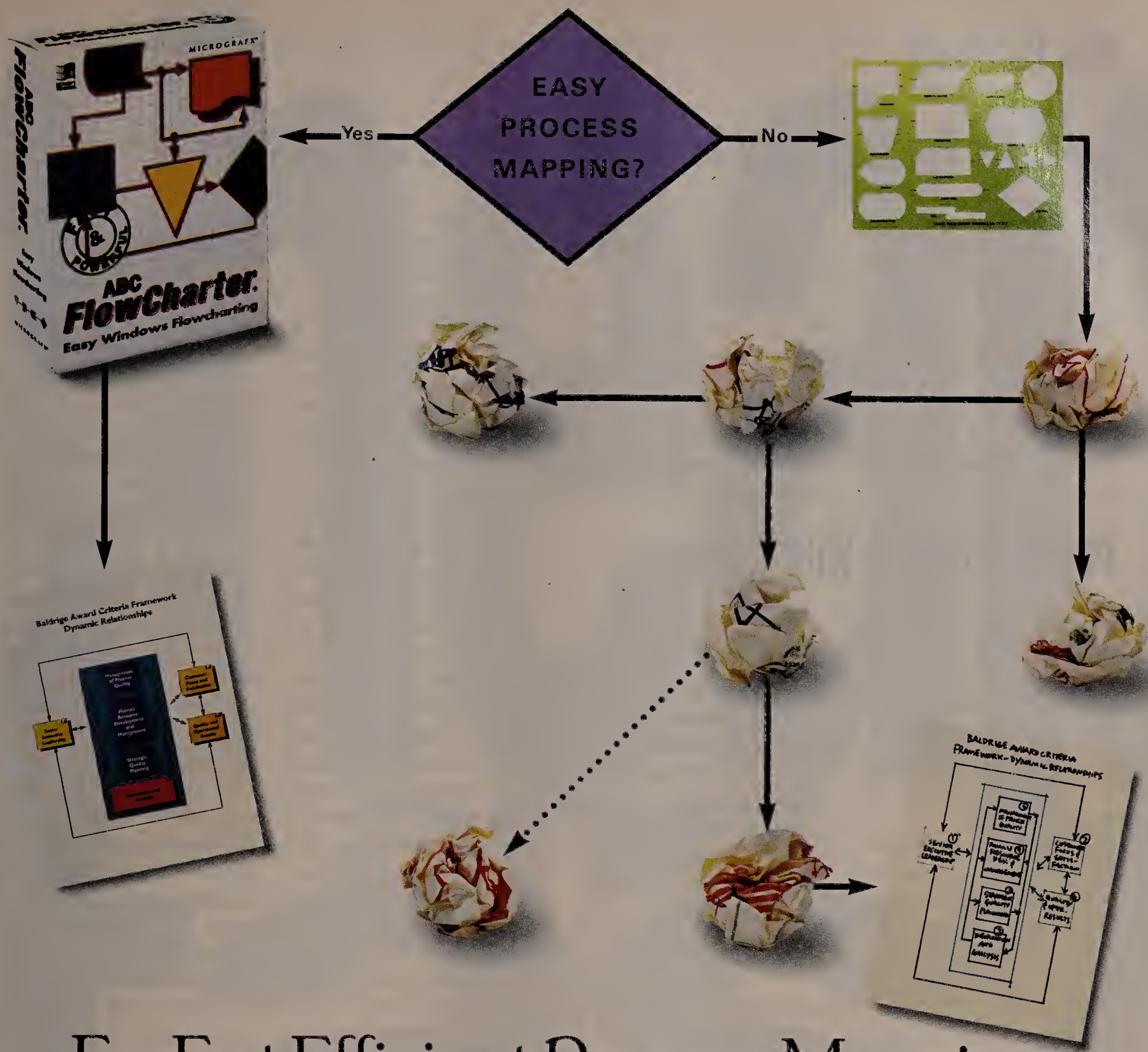
All systems include 4MB of RAM (expandable to 64MB) and a 170MB hard drive. One notable drawback: All the units come with a mushy keyboard that we found inadequate.

DEC doesn't skimp on service. All Value Line products include one year of on-site service, plus two years of factory service with a promised 48-hour turnaround. This is one of the best warranties in the industry.

—Laurianne McLaughlin

DEC LP Value Line

DEC's Value Line PCs offer a plethora of processor and graphics options at affordable prices, plus a three-year warranty.
Digital Equipment Corp.
800/722-9332,
508/493-5111
List price: LPv $1448 to $2198, LPx $1698 to $2348
Reader service no. 702



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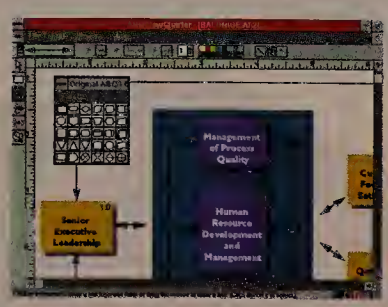

Simply choose a shape and place it. Lines automatically connect and stay connected if shapes are moved.

So take the first step in improving efficiency in your company. To find out more about ABC FlowCharter call 1-800-578-3510 or contact your local software dealer.

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ABC FlowCharter

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Circle 128 on reader service card

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Continued on page 114

Lexmark's Personal Laser Printer: Inexpensive and Durable

To differentiate their low-priced laser printers, vendors have created two classes of products: eye-catching home appliances with limited upgradability, such as Hewlett-Packard's $849 HP 4L, and miniature versions of industrial-strength printers, such as Epson's $799 ActionLaser 1000. With the new $799 IBM 4037 5E Page Printer, Lexmark goes the industrial route.

Lexmark differentiates the 4037 5E from its industrial-strength competitors by making the device more durable. The printer's duty cycle, or maximum workload, is a robust 16,000 pages per month—one of the highest in this price range. By comparison, the Epson ActionLaser's duty cycle is 11,000 pages per month.

The 4037 5E employs LED (laser-emitting diode) imaging technology, which requires fewer moving parts and is more reliable than the laser imaging available in comparably priced printers, Lexmark claims. In addition, the 4037 5E offers a straight paper path, which lets you print on heavy paper stock to create cards or small posters —a feature not found on all printers in this price range.

This printer also offers output features not common in its price range. Lexmark includes print quality enhancement technology and a proprietary font-scaling printer language, PPDS, which work in tandem to produce smooth, high-quality output that's comparable to that of the similarly equipped HP 4L. (The Epson ActionLaser does not offer either technology in its standard configuration.)

On the downside, the 4037 5E won't set any land-speed records. The device is powered by a 5-page-per-minute (ppm) engine and a Motorola 68000 processor. In informal tests, the printer was only slightly faster than the 4-ppm 4L on word processing documents. While the 4037 5E was about 30 percent faster than the 4L on a complex desktop publishing document, it was no faster than a cheaper 4-ppm printer with a RISC processor. (RISC processors typically handle complex tasks faster than non-RISC chips like the 68000.) Another significant limitation: Unlike the ActionLaser, the 4037 5E isn't upgradable to PostScript.

Still, the 4037 5E offers a plethora of other upgrade options, such as an additional 250-sheet paper tray that boosts paper capacity to 400 sheets, easily accessible slots that let you upgrade the printer's standard 512K of RAM with an additional 4MB, and a 23-font add-in card or flash memory module for storing scalable fonts. If you crank out lots of documents and simple graphics, and need a durable printer, the 4037 5E is worth considering.

—Randy Ross

Lexmark IBM 4037 5E Page Printer

This durable, low-cost personal laser printer offers nice extras—and a few trade-offs.
Lexmark Int'l Inc.
800/358-5835,
800/663-7662 (Canada)
List price: $799
Reader service no. 704

INDUSTRIAL-STRENGTH PERSONAL PRINTER: Lexmark's IBM 4037 5E has a straight paper path, uncommon in this price range.

Philips Monitors With Speakers

Plenty of products are called "state of the art," but the new Brilliance line of monitors from Philips actually deserves the honor. These 15-, 17-, and 21-inch displays offer just about every cutting-edge feature imaginable.

The Brilliance 1520AS is a 15-inch monitor equipped with stereo speakers, amplifier, headphone jacks, and volume control. The 1520AS displays resolutions of up to 1024 by 768 with a flicker-free 72-Hz refresh rate. While it uses analog controls, the display automatically maintains the correct vertical height when you switch from one video mode to another (from Windows to DOS, for example). And its Advanced Monitor Deflection Control prevents the bouncing and distortion that commonly occur when you are switching between modes.

The 17- and 21-inch Brilliance 1720DC and 2120DC both use digital controls, which means they can remember the appropriate size and position of the on-screen image for a number of display modes. The 1720DC can store settings for 27 modes (12 of them preset at the factory, the rest user-customizable), while the 2120DC can store 22 (14 of them preset).

Both the 1720DC and the 2120DC display resolutions of up to 1600 by 1280 at 60 Hz. At the more common 1280 by 1024, they offer a 76-Hz refresh rate. Both have LCD display panels that indicate resolution and other parameters.

All meet the Swedish MPR-II standard for electromagnetic emissions, and all are backed by a two-year warranty.

The 21-inch Brilliance 2130 has a magnetometer that detects variations in the earth's magnetic field and then adjusts accordingly.

—Dan Miller

Philips Brilliance Monitors

Three trendsetting monitors with built-in speakers and other advanced features.
Philips Consumer Electronics
800/835-3506
List price: Brilliance 1520AS $699, Brilliance 1720DC $1499, Brilliance 2120DC $2999
Reader service no. 703

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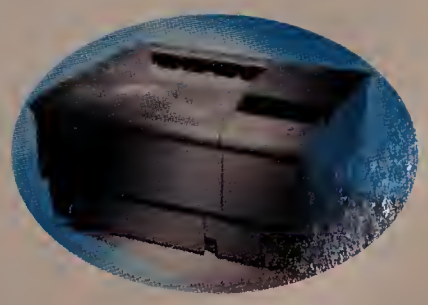
We're proud of our printer's reputation. And we're also proud of the Silentwriter® 1097's many features. Features like 600 DPI print quality, and PhotoMatch™ grayscaling. Along with PC and Macintosh connectivity, Adobe PostScript™ software, HP® LaserJet® III emulation, plus Automatic Emulation Switching. Our Novell network capability. Not to mention our extremely fast RISC-based 10ppm print speed. With all of these features for under $1500 it doesn't matter what you call us. As long as you call: 1-800-NEC-INFO. Or for information via fax, call NEC FastFacts™ at 1-800-366-0476, request document #791097. **NEC**



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COMPUTER CORPORATION

JUST SIX OF MANY AMBRA MODELS...

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- 486SX, 25 MHz
- Upgradeable to Pentium technology
- 4MB RAM, max: 36MB
- 128KB processor cache
- 3.5" 1.44MB diskette drive
- 170MB (17ms) hard disk
- 3 storage bays
- 3 16-bit ISA slots (2 VESA on local bus)
- Windows accelerator w/ 1MB video memory
- 14" SVGA LR color monitor
- Slimline casing (3 x 3)
- MS-DOS® 6.0, Windows™ 3.1, mouse

$1,339

Slimline S450DX

- 486DX2, 50 MHz
- Upgradeable to Pentium technology
- 4MB RAM, max: 36MB
- 128KB processor cache
- 3.5" 1.44MB diskette drive
- 240MB (15ms) hard disk
- 3 16-bit ISA slots (2 VESA on local bus)
- 3 storage bays
- Windows accelerator with 1MB video memory
- 14" SVGA LR color monitor
- Slimline casing (3 x 3)
- MS-DOS 6.0, Windows 3.1, mouse

$1,815

Desktop D466E/VL

- 486DX2, 66 MHz
- Upgradeable to true 64-bit Pentium technology
- 8MB RAM, max: 64MB
- 256KB processor cache
- 3.5" 144MB diskette drive
- 440MB (12ms) hard disk
- 8 32-bit EISA slots (2 VESA on local bus)
- 6 storage bays
- S3 video accelerator with 1MB DRAM
- 15" Flat Square LR color monitor, NI
- Desktop casing (8 x 6; convertible to minitower)
- MS-DOS 6.0, Windows 3.1, mouse

$2,959

Minitower T466DX

- 486DX2, 66 MHz
- Upgradeable to Pentium technology
- 8MB RAM, max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 340MB (12ms) hard disk
- Onboard SCSI
- 8 16-bit ISA slots (2 VESA on local bus)
- 6 storage bays
- Windows accelerator with 1MB video memory
- CD-ROM drive
- 14" SVGA LR color monitor
- Network-ready (Ethernet 10BaseT)
- Minitower casing (8 x 6)
- MS-DOS 6.0, Windows 3.1, mouse

$2,694

Pentium DP60E/VL

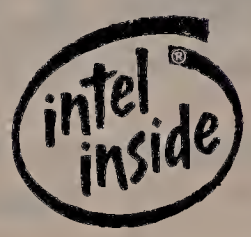
- Intel Pentium processor, 60 MHz
- 64-bit processor complex
- 8MB RAM, max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 540MB SCSI hard disk
- Onboard dual-channel Fast SCSI-2
- 8 32-bit EISA slots (2 VESA on local bus)
- 6 storage bays
- ATI® Ultra Pro™ Mach 32, 2MB VRAM
- 14" SVGA LR color monitor
- Desktop casing (8 x 6; convertible to minitower)
- 200-watt autoswitching power supply
- MS-DOS 6.0, Windows 3.1, mouse

$3,999

Notebook NC425SL

- 486SX, 25 MHz, SL-Enhanced
- Dual-scan STN color screen
- Integrated fax/modem
- 4MB RAM
- 120MB hard disk
- Integrated trackball
- MS-DOS, Windows, MS-Works™

$2,449



In Canada,[4] call 1-800-363-0066, Ext. 913

CALL 1-800-252-6272, EXT. 337

1-800-25-AMBRA

[1] Please call 1-800-252-6272 for details regarding AMBRA's money-back guarantee and limited warranty. One-year onsite service at no additional charge during warranty. Onsite service may not be available in certain locations.
[2] Return shipping and insurance charges are the responsibility of the customer. [3] CD-ROM drive required; may be purchased with system or separately. [4] Offerings may differ in Canada.

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Continued from page 108

Two Powerful and Friendly Multimedia Editing Programs

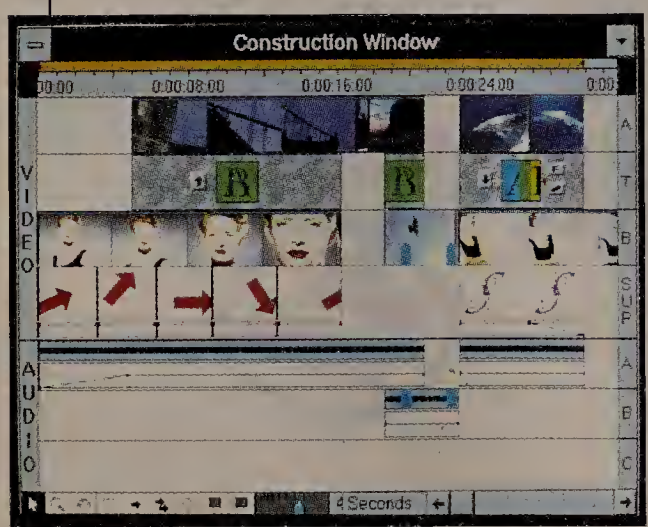
Even if you've never touched a piece of video-editing equipment before, you'll be surprised at the slick things you can do with two new multimedia editing packages. These products let you create multimedia presentations and sales tools on your desktop system without having to invest a lot of time in learning the process, thanks to their intrinsic ease of use and the included video-editing tutorials.

ATI's MediaMerge

ATI Technologies' $299 MediaMerge program consists of separate storyboard, scene, text, and audio editors. You choose video and audio clips from a variety of sources; edit them for length, color, titling, special effects, and filters; and finally assemble the finished product on the storyboard. You open storyboard, scene, and audio windows individually using the icons on the desktop. Then load the files you want to use from your disk or CD ROM into the appropriate editor. To load a scene into a storyboard box, double-click the box you want to fill and choose from the list of files presented.

Once you've assembled your finished scenes in the storyboard editor, you can select from one of MediaMerge's nine transition types to move from scene to scene. These include wipes, dissolves, moving blinds, and other options that you learn about in the tutorial. Small boxes between the scene boxes show where the transition is located and whether one is in place. For audio, you can use MS Sound Recorder WAV and Soundblaster VOC files in the audio editor, then transfer the finished audio to the storyboard and preview your creation. When you are satisfied, play back the finished version to dazzle the locals. MediaMerge also includes a CD ROM with over 300 video and audio files.

Adobe Systems' Adobe Premiere is the PC version of its popular Macintosh multimedia product. At $295, Premiere gives you a screen full of simultaneous scene, storyboard, and audio editors. You don't have to press <Alt>-<Tab> to move among editors as you do with MediaMerge; you just move the audio and video files to the appropriate editing windows to build your product.



ADOBE PREMIERE puts all its component editors into one screen, making it easy to navigate among the windows.

For some users, Premiere's greatest asset may be its ability to import and export files in Microsoft Video for Windows or Apple QuickTime formats. You can also import QuickTime video in the compressed format and fiddle with it in Windows. If you work in a PC-Mac hybrid environment, this duality lets you move your work between the two environments.

MEDIAMERGE USES SEPARATE STORYBOARD, scene, text, and audio editors to assemble a multimedia presentation. You use the Storyboard Editor (above) to arrange your finished scenes.

Premiere and MediaMerge both work with the popular PC multimedia file formats; however, Premiere has some Macintosh capabilities and more transitions and stock special effects. On the other hand, it has no built-in text handling. MediaMerge handles VOC and WAV audio files, offers an animated text feature that lets you scroll text across the screen, and includes a CD ROM full of multimedia images and sounds.

PC to Mac Duality

If you operate in a PC-Mac environment and already have Adobe's Photoshop, you'd probably prefer Premiere because you'll need Photoshop to do titling. If you aren't concerned with Mac compatibility and don't have an application with text-editing features, ATI's MediaMerge is a good choice because it has everything you need in one shot, including animated-text processing. MediaMerge also has Object Linking and Embedding (OLE) capabilities, so you can embed its media player and selected files into other Windows programs. Although both products will do the job, each has a distinct feel, so experiment before you buy.

—Gene Smarte

MediaMerge 1.0

WINDOWS This powerful and easy-to-use multimedia editor also has a good tutorial for novices.
ATI Technologies, Inc.
905/882-2600,
905/882-2620 (fax)
List price: $299
Reader service no. 705

Adobe Premiere 1.0

WINDOWS This full-featured multimedia editor offers Mac file compatibility but lacks titling.
Adobe Systems, Inc.
800/833-6687
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Corporate Vision Checks Your Business From All Angles

Corporate Vision 1.0

WINDOWS Analyze data from many angles quickly.
IntelligenceWare, Inc.
800/888-2996,
310/216-6177,
310/417-8897 (fax)
List price: $690
Reader service no. 707

IntelligenceWare's Corporate Vision 1.0 unites graphing, database, spreadsheet, and multidimensional data-analysis functions under a single interface. You can take your typed-in data or dBASE, Paradox, Oracle, Sybase, DB2, or SQL database records and look at the relationships of all the fields using graphs, tables, and text. The result is an easier way to view how items interrelate.

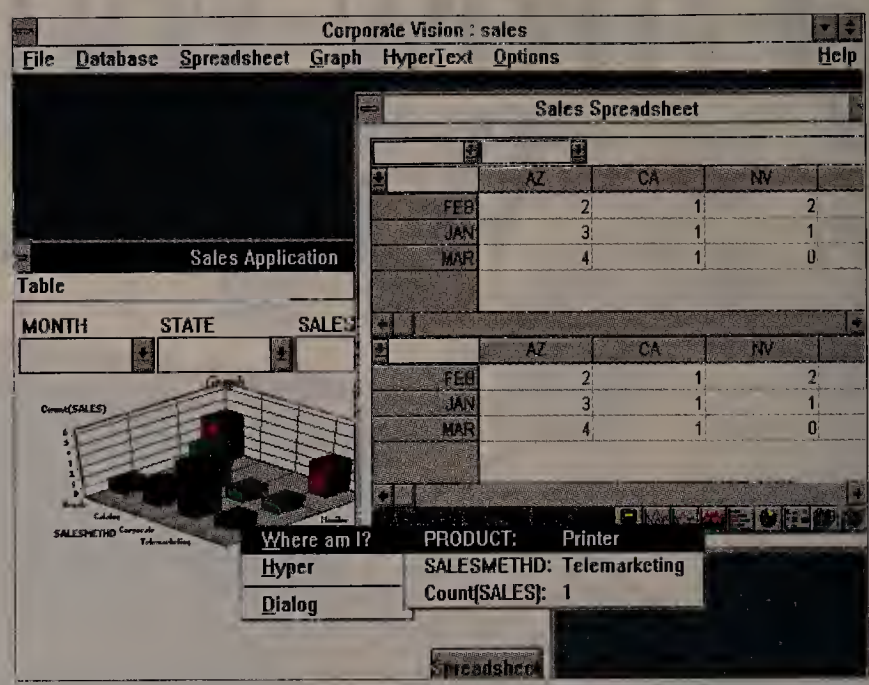
Corporate Vision has two modes: General Use mode presents data in graphs and spreadsheets; Customization mode lets you build your own applications. The program lets you easily connect graphs, spreadsheets, and tables view data. For example, when presenting information in a traditional 3-D bar graph, you are limited to three variables. If you need to add a new element to compare to two of the original three, you have to redefine the graph, replace one of the variables, and display the results, repeating this process over and over for each permutation of variables.

With Corporate Vision, you essentially load all the variables from your database into your graph when you define it. You select which three you want to use by clicking their names on drop-down menus. Choosing the sets of variables establishes your view of the graph. You can construct and use spreadsheets in a similar way.

Furthermore, you can link hypertext files to all the elements of your graph. Just click an element of a bar chart, for example, to see more explanation. You can also click a word or spreadsheet cell and pop up another graph or spreadsheet.

Corporate Vision has just one drawback: It will take you time to learn everything you can do. If you need to look at your business from every angle, check out Corporate Vision.

—Gene Smarte



CORPORATE VISION lets you analyze and display all the relationships among your database fields with a minimum of effort.

The Wait Is Over: XyWrite for Windows Arrives

The Technology Group's XyWrite for Windows word processor incorporates features of the existing DOS versions, which have been so popular with professional writers and editors. If you've been using XyWrite 4.0 or its predecessor, XyWrite III Plus, and want to move to a Windows implementation, this product is a good bet. But if you're content with your current word processor, keep it: XyWrite for Windows' features won't compel most users to switch.

XyWrite for Windows

WINDOWS A must-see for XyWrite users contemplating a move to Windows.
The Technology Group
410/576-2040
List price: $495, upgrade $129, competitive upgrade $149
Reader service no. 708

XyWrite has always been popular because of its quickness and customizability. The Windows version, though it's bogged down by the same processing overhead that affects all Windows products, preserves many of its predecessors' high-performance features. For example, the program still offers a command line for keyboard commands; the command line can be displayed at the top or bottom of the screen. A stack feature, introduced in XyWrite 4.0, stores command-line activities, so you don't have to retype long commands such as complex search-and-replace strings. The Windows product also maintains full file and programming compatibility with XyWrite III Plus and 4.0, the company claims.

XyWrite users tempted by other Windows word processors should keep in mind the special touches that make this product unique, such as features for handling long documents that have been broken into separate files or chapters. For example, a batch-spell feature lets you spell-check groups of closed files. Likewise, a global format capability lets you reformat closed documents stored in a single directory. XyWrite still offers redlining that automatically records the dates of edits and who made them.

One new feature lets you send E-mail and documents from inside XyWrite over E-mail products that are compatible with Vendor Index Messaging (VIM), such as cc:Mail.

Among the minor drawbacks: The Windows interface doesn't conform to some conventions used in other Windows applications. The program also lacks an undo feature.

These quibbles aside, this version of XyWrite offers users of the DOS versions a clear Windows upgrade path.

—Randy Ross

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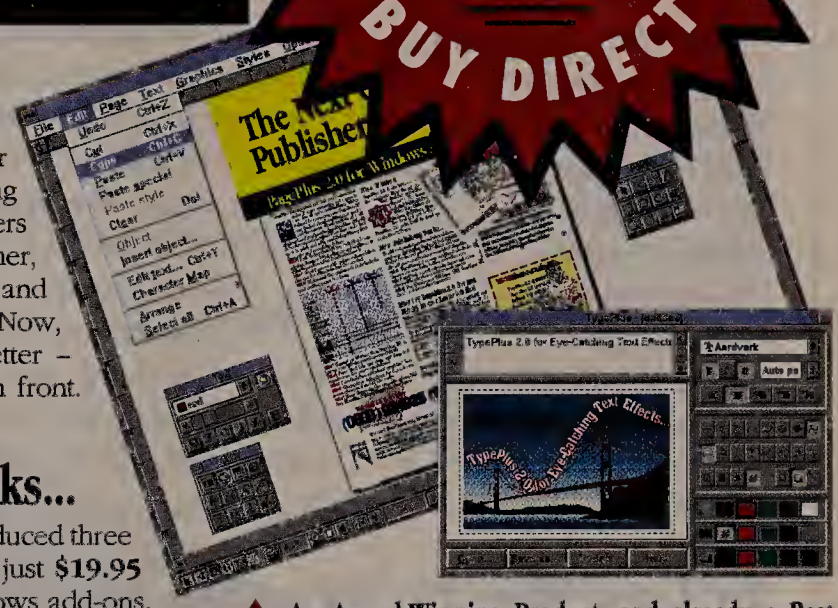

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Circle 225 on reader service card

Aldridge's Inexpensive, Easy-to-Use Disk Cache

The Aldridge Company is known for its Trec86 4.0 file manager and Cache86 5.0, a bargain-priced no-frills disk cache that improved the performance of applications just as effectively as more expensive products but was notoriously difficult to install. Now Aldridge has addressed this limitation with Cache86 5.0 for Windows and DOS, which provides Windows users with an automatic installation routine (DOS users must still install manually). The setup now scans your start-up files for Microsoft's SmartDrive cache, although you'll have to remove other caches from your AUTOEXEC.BAT and CONFIG.SYS files manually.

The Cache86 Windows setup presents a dialog box that's chock-full of options. You can size the cache, choose between write-through or delayed-write modes, set your write delays, and more—all from a single screen. You even have one-click access to Windows' SysEdit. If you get confused about any of the choices, you simply select the item, click the question mark, and get a detailed, thoughtful explanation. The suggested default cache size, 2MB on our 486 with 8MB of RAM, will be optimum for most Windows users.

After installation, Cache86 leaves a handy control panel on the desktop, giving you exceptionally easy cache control. You can enable and disable the cache or the delayed-write feature on the fly with a click of your mouse. You can also flush the cache or get a statistical readout, which will even tell you whether you have unwritten data in the cache. Furthermore, the control panel gives you easy access to Trec86 4.0, if you have it installed, or its own setup if you want to change your settings. Testing we did for our June 1993 article "Caches Pay Off" showed little difference in application performance among cache products. That said, it's impressive to watch an inexpensive cache such as Aldridge's go from last place to first in the usability race.

—Rex Farrance

Aldridge Cache86 5.0 for Windows and DOS

WINDOWS **This eminently adjustable product for Windows and DOS brings a new level of usability to disk caching with its nifty Windows interface.**
The Aldridge Co.
713/953-1940
List price: $89.95
Reader service no. 710

An Easy Way to Assemble Multimedia Shows

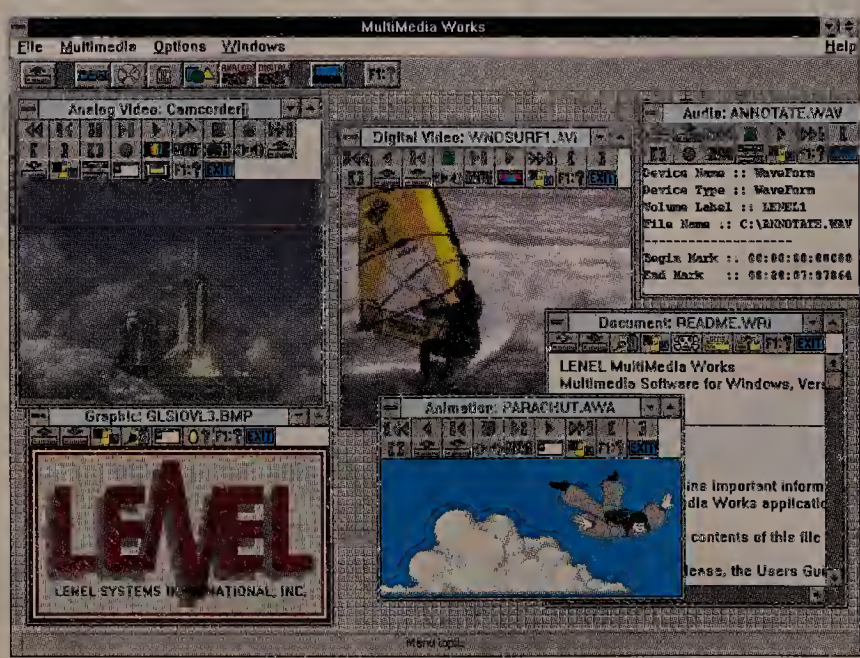
Unlike multimedia *editing* software, Lenel Systems International's MultiMedia Works 1.5 is designed for *assembling* ready-to-run clips into presentations. The program works with more than 40 file formats, so you can use a wide variety of sources for your production. You can do some video and audio editing, but the program does not compete with dedicated multimedia editing software.

The product includes a Multimedia Enabling Server module, for embedding multimedia objects or entire shows into just about any Windows-based application using OLE and Dynamic Data Exchange (DDE) and, if you have the company's MultiMedia Works Developer's Toolkit ($499), using Dynamic Link Libraries (DLL). Embed objects by copying them to the Clipboard and pasting them into applications. MultiMedia Works supports analog devices like video decks, laser disk players, and cameras, and has analog drivers.

The Multimedia Player sees all multimedia files as objects, whether the files are audio, video, or analog. You can play one file or a sequence of files quickly by opening the Windows File Manager, sizing it to view the MultiMedia Works screen, and clicking the files you want to play. This is great for creating a rough draft.

You also use the Multimedia Player to set the style, size, and placement of the objects and windows and to control audio start and stop points from CDs and audio files. Once you settle on the objects for your multimedia show, you use MultiMedia Show Builder to set the sequence of your selected video, animation, graphics, and audio objects. You can set the number of times an object repeats, set background colors and playing times, and synchronize the audio for the show.

—Gene Smarte



FAST PRESENTATION BUILDER: Lenel Systems' MultiMedia Works is compatible with virtually all multimedia file extensions.

MultiMedia Works 1.5

WINDOWS **An easy way to assemble stand-alone or embedded multimedia presentations.**
Lenel Systems Int'l, Inc.
716/248-9720,
716/248-9185 (fax)
List price: $99
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In the dog-eat-dog world of business presentations, we just made you a pit bull with the legs of a greyhound.

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But what is it that makes the Phaser 200 so good? For starters, the ink coverage and image quality are, in a word, brilliant. We at Tektronix didn't get to be the award-winning leader in color printers by sitting on our hands. Then there's speed. You get all of this great color at two pages per minute, which is nearly as fast as a regular black and white printer. Can you say increased productivity?

On top of all this, the Phaser 200 is a work group printer that gives you the advantages of a laser printer. Including true Adobe® PostScript™ Level 2, networkability, separate paper and transparency trays and price (did we happen to mention the Phaser 200 has a list price of only $3,695?).

For more information or a free output sample, come into your nearest Tektronix dealer or call us at 800/835-6100, Dept. 311. For faxed information, call 503/682-7450, and ask for document # 5001.

In closing, we just want to remind you that your competition is also reading this ad. And they're extremely hungry. So when choosing a presentation printer, the choice is quite simple. You can either eat, or be eaten. Bon appétit. **Tektronix**

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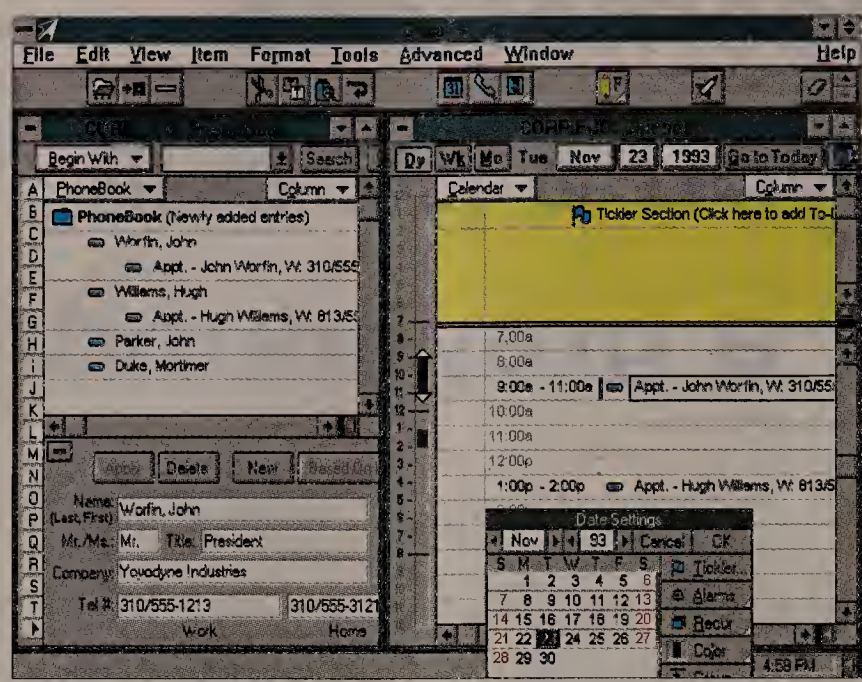
Point-and-Click PIM Is Simplicity Itself



SIMPLE DOESN'T MEAN LESS: Simplicity lets you drag-and-drop phone book entries to create appointments automatically.

Arabesque Software gained critical acclaim with its powerful Ecco Professional personal information management program. Unfortunately, the depth of the program's features and highly flexible interface confounded many users. Enter Ecco Simplicity, a scaled-down version of Arabesque's flagship product that delivers much of the power, but little of the pain, that its big brother possessed.

Built around a calendar and an address book, Simplicity features an efficient point-and-click interface that lets even the busiest professional get up and running immediately. The calendar is laid out like a traditional day planner and includes push-button controls for scrolling through days, months, and years. You enter appointments directly on the page and set recurring events by date, day of the week, or other methods. The scheduler's alarm can play specific WAV sound files for certain events, launch applications, and load files.

On the address-book side, Simplicity keeps a spreadsheet-like table of contact records, with columns for company, name, fax number, and work phone. Records are kept in alphabetically tabbed listings—as in a paper-based address book—while an easy-to-use search engine lets you find records by a variety of fields. If you have a modem, Simplicity's auto-dial feature will call your contacts at the push of a button. Particularly useful is the program's interactive import function, which accepts comma-separated text files so you can quickly move your data from other packages.

Ease of use remains a focus when you're working between Simplicity's views or with other applications. To set up an appointment with a listed contact, users simply click the appropriate address-book entry and drag it to the scheduler—eliminating the need to retype data. Simplicity also enables you to launch applications by associating them with items such as events and contact records. And Simplicity's Shooter function, also found in Ecco Professional, makes it easy to move data to and from the PIM. Finally, Simplicity shares an identical file format with all versions of Ecco Professional, for easy communication between versions. Ecco Simplicity lists for $149.

—Michael Desmond

Ecco Simplicity

The benefits of a PIM, without the complexity. Simplicity lowers the learning curve and still delivers powerful features and flexibility.
Arabesque Software
800/457-4243, 206/869-9600
List price: $149 ($79 introductory offer through the end of 1993)
Reader service no. 793

Eclipse Find: An Inexpensive Windows File Manager

One of the benefits of today's hard disks is vast storage capacity. Unfortunately, it's easy to get lazy when you've got a 200MB drive: unused documents, spreadsheets, and assorted graphics files can fill that space in a hurry. Windows file managers such as Phoenix Technologies' Eclipse Find, an inexpensive utility that makes it easier to view, organize, and archive your files, can help.

With a street price under $50, Eclipse Find performs a variety of simple yet useful tasks. Its file viewer lets you view popular word processing, spreadsheet, database, and graphics files in their native formats. The program's icon-driven interface makes deleting and archiving files easy. Other point-and-click tasks include printing, copying, and moving files, and adding text to the Windows Clipboard.

Eclipse Fax lets users send a fax within Eclipse Find: When you've located the document you want to send, click the fax icon; up pops Eclipse Fax, which lets you fill out a cover sheet before you fax.

Eclipse Find lets you search for documents by keyword, file type, date, and other criteria. Once you locate a file, launch its associated application by double-clicking the file name. You can narrow your search results by focusing on specific words—for instance, instructing Eclipse Find to look for files that contain both a specific project and a customer.

After you load Eclipse Fax, you can access it within other Windows programs. First click the upper left corner of your control box, then select *Eclipse FIND* from the menu.

—Jeff Bertolucci

Eclipse Find

WINDOWS A handy, low-cost Windows file manager.
Phoenix Technologies
800/452-0120
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Cool Tools for Avoiding Windows' Program Manager

Toolbox for Windows

WINDOWS This easy program launcher ensures that your apps are never more than a mouse click away.
PC-Kwik
800/284-5945,
503/520-4295,
503/646-8267 (fax)
List price: $29.95 direct through December, $49.95 thereafter
Reader service no. 803

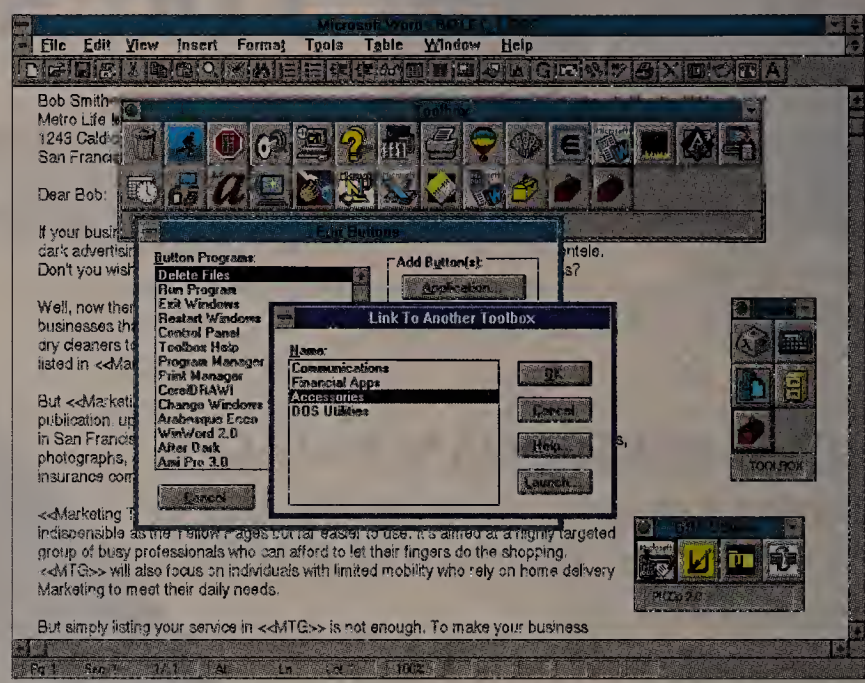
If you're tired of having to use Windows' Program Manager every time you launch an application, PC-Kwik's Toolbox for Windows may have the solution. This utility—an offshoot of PC-Kwik's popular WinMaster tool kit—holds up to 50 Program Manager icons in a box that pops up on your screen, letting you fire up programs with a click of your favorite rodent.

Choose which icons to load when you install the program, or add them later—but Toolbox doesn't show up empty-handed. It has icons for running apps, performing fast Windows exits and restarts, and choosing between other Windows shells, and a trash-can icon to drag and drop files from Windows' File Manager for easy deletions.

Best of all, you can customize toolboxes and link them to your main toolbox. For example, you can create one toolbox for all your Windows accessory programs and link it to another containing your DOS utilities, then summon tools when you need them, without cluttering the screen with icons. However, if you run DOS apps under Windows, you'll have to add the icons manually—Toolbox can't detect them at installation. If you've set up separate working directories for your data, you'll have to add those manually, too.

Toolbox also lacks the clock and calendar, memory gauges, easy printer management, and other goodies of more complete Windows shells such as HP's Dashboard and hDC's Power Launcher. However, Toolbox is easier to use, takes up half the disk space (a cozy 800K), and costs a lot less ($29.95 through December, $49.95 thereafter)—good news for any budget-minded Windows user.

—Daniel Tynan



PC-KWIK'S TOOLBOX FOR WINDOWS lets you create as many toolboxes as you like and link them all for easy program launching.

Outliner for White-Hot Brainstorming

Since every major Windows word processor has a built-in outliner, why would anyone want Portfolio Software's new Dyno Notepad outliner? Simple: Because it isn't built-in. My word processor's outliner always seemed too hard to figure out when I needed it the most: during frenetic brainstorming, which outliners ought to accommodate with style and grace. Dyno Notepad, on the other hand, takes only minutes to get used to and an hour or two to master. With a few keystrokes, you can bang out topics and subtopics as quickly as your brain serves them up. The program's "family tree" metaphor defines topics and subtopics as Mothers and Daughters, respectively. Subtopics with the same Mother are called Sisters, and a Sister to a Mother topic is an Aunt. While this litany may start to sound like the Hapsburg family succession, it all makes sense once you use the product.

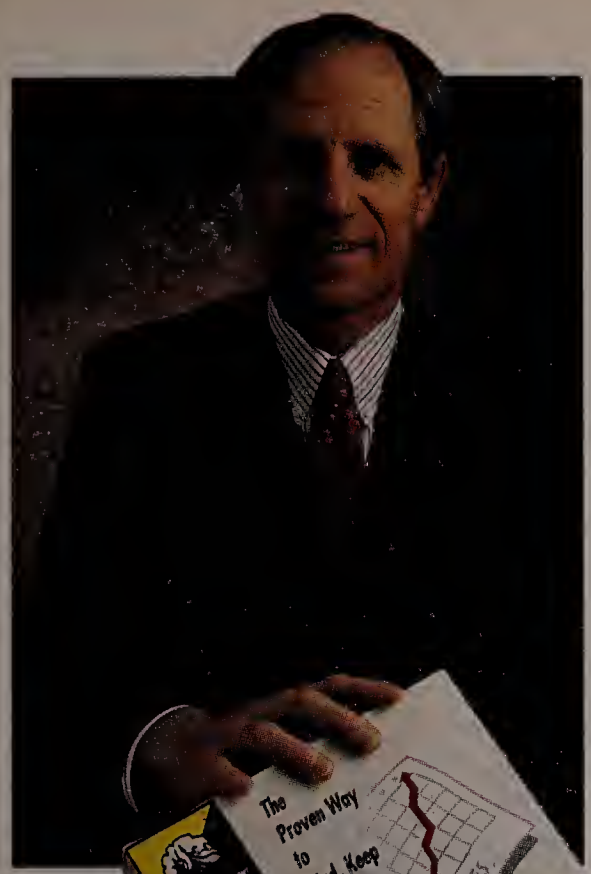
Dyno Notepad

WINDOWS An outliner that's easier to use than the ones in most word processors.
Portfolio Software Inc.
800/729-3966,
408/252-0440 (fax)
List price: $59.95
Reader service no. 802

Double- or right-clicking on a topic label expands or collapses its underlying subtopics. Drag-and-drop editing easily moves topics and their relatives to a new place in the outline. Borrowing from its Macintosh twin, Dyno Notepad's interface employs two notable traits I'd like to see more of in Windows programs: a separate pulldown menu for fonts and styles, and "smart quotes" (" and " instead of "), which are absent from nearly every Windows program. Other format options include color and marker choices for topic labels. Predefined labels include triangles, check boxes, and decimal and customizable bullets. Global commands let you change some or all topics at once; for example, collapse all topics or convert all Aunt-level topics to 18-point Helvetica bold. File import and export formats include Grandview, PC-Outline, Ready, and Acta for Mac. Word processing formats include TXT and RTF.

While Portfolio suggests using Dyno Notepad for to-do lists, the lack of date stamps and calendar logic doesn't suit it for true project management. I found it perfect for organizing research projects and book proposals, creating a conference agenda, and reworking the plot of a novel in progress—none of which could I pull off as effortlessly with my word processor's whiz-bang built-in outliner. A noteworthy distinction indeed.

—Joe Hutsko



"ACT! WILL MAKE YOU MORE SUCCESSFUL IN 30 DAYS OR YOU DON'T PAY."

Patrick Sullivan
Vice President and General Manager
Contact Management Division, Symantec

The best-selling software that's changing the way the world does business.

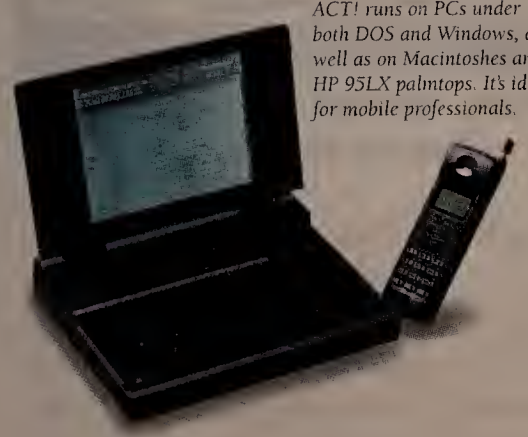
All over the world, people are joining the ACT! revolution. Piling up prospects. Doing two, even *three times* as much business as before. And astonishing their customers with a level of personal service they've never experienced.

For over half a million success-driven people, ACT! has already become a way of life!

The Proven Way to Find, Keep and Satisfy Your Customers.

In the race for new customers, your competition is breathing down your neck. With ACT!, you'll leave them in the dust.

Pop-up reminders let you know exactly who you need to call and what you need to do at any time of day. You can easily stay on top of hundreds of leads, prospects and customers!



ACT! runs on PCs under both DOS and Windows, as well as on Macintoshes and HP 95LX palmtops. It's ideal for mobile professionals.

Want to send a thank-you note, or a bunch of prospect letters? Just use the built-in word processor with spell-checker, or select one of your pre-written form letters.

Then let ACT! fill in the names and addresses, and print the letters and envelopes. There's no need to type to keep in touch!

Your customers will be blown away by your impeccable, personal service. While you're on the phone, you'll have instant access to every detail about the person you've called — including past phone conversations and letters sent, schedules and "next steps." Even the little things — a spouse's name, or a favorite restaurant — that make people feel truly valued and ready to do business.

With ACT! in control of the details, you're free to concentrate on *profitable, business-building activities.* Customers report *doubling* or *tripling* their business volume with ACT!.

Need to change an appointment? ACT! is your comprehensive activity planner, too. Just "drag and drop" the meeting into its new time slot. Then print your revised daily, weekly or monthly calendar. You'll never forget another call, meeting or to-do!

You can also track and analyze your progress with a variety of reports, including prospect reports, activity reports, customer history reports and more.

What They're Saying About ACT!

"ACT! for Windows and my notebook computer are the ultimate sales combination."
Lon Orenstein
Computer Support Network

"I've tripled my business since I started using ACT!. It's a miracle."
John Rizzuti
Rizzuti Marketing and Media

"There's good reason for ACT!'s ongoing dominance of the contact management field. Both the DOS and Windows versions offer a comfortable balance of out-of-the-box usability and individual customization."
PC Magazine, Editors' Choice Award Winner, August 1993

ACT! for Windows 1.1
August 1993

Free 30-Day Trial!

Try ACT! free for 30 days. Simply pay the $9.75 shipping & handling charge with a major credit card. If you don't see *bottom-line results* within 30 days, just return it and you'll owe nothing more.

If ACT! boosts your success like we say it will, keep it—and pay a limited-time price of only $199 *(that's half the $399 suggested retail price)*. Don't let this extraordinary offer pass you by!

Call 1-800-628-4777 ext. AD47.

OR SEE YOUR SOFTWARE DEALER...
For a limited time, you can get a great deal through your software dealer, too. **Just call the number above to request your $50 rebate certificate.** (Free trial not available through dealers. Only major credit cards accepted.)

ACT!®
The Best-Selling Contact Manager
SYMANTEC.™

Rebate offer good on end-user purchases of ACT! for Windows or ACT! for DOS between June 1, 1993 and December 15, 1993 from software resellers only. Valid product serial numbers and purchase signature must be present to receive rebate. Not applicable to education, upgrade, and other specially priced product. Not valid with any other promotion. Offer not available for resellers. Offer valid in the U.S.A. only. Prices listed in U.S. dollars. Limit one rebate or one special $199 offer per customer. Rebate not available on ACT! for Macintosh. ACT! for Macintosh suggested retail is $249.95. Tax, shipping and handling charges may apply. For complete information via fax, call 1-800-554-4403, select option #1 and request document #170 (ACT! for Windows), document #160 (ACT! for DOS), or document #180 (ACT! for Macintosh). The names of other products are trademarks or registered trademarks of their respective holders. ©1993 Symantec Corporation. All rights reserved.

Continued on page 133

Add Speed and PostScript to Your Printer

Windows users who want to add PostScript capabilities to their non-PostScript printers at minimal cost have a new option. Zenographics' ZScript is a PostScript emulator program that you install as a Windows application on your desktop PC. The product lets you view; cut and paste; and, most important, print PostScript files. ZScript also includes SuperPrint 3.0, a utility that speeds up Windows printing. This product is one of the most expensive in its category, but the print utilities and cut-and-paste capabilities are nice additions and not available in products from competitors.

ZScript includes the standard features that make adding PostScript via PC-based software a smart choice when compared with the common hardware alternative: cartridges that plug into the font slots of a printer.

At $295, ZScript costs less than most cartridges, and when running on a fast PC, it offers comparable if not superior performance, particularly with graphics. On a 33-MHz 486DX, the vendor says, the product is up to six times faster than cartridge upgrades.

ZScript works with popular printers, including dot matrix, ink jet, laser, and even some 600-dpi and color devices. Zenographics also sells special drivers for high-end output devices such as imagers and film recorders.

SuperPrint 3.0 is the latest version of Zenographics' popular print utility. The product has been rewritten as a 32-bit program that the vendor says is four to ten times faster than its 16-bit predecessor when printing text and graphics. The product also includes "SuperDrivers" for common printers that help process font and other document information to speed printing, and SuperQueue 3.0, which provides smoother background printing and returns the use of your keyboard faster than Windows can using its Print Manager. SuperPrint 3.0 is available for $99 separately.

—Randy Ross

ZScript

WINDOWS This software program lets your laser, ink jet, or dot matrix printer print PostScript output at minimal cost. The additional utilities speed printing and let you get on with your work.
Zenographics
800/366-7494,
714/851-6352
List price: $295
Reader service no. 809

Print Booklets and Fliers in Your Sleep (Almost)

This $69.95 print utility enables you to easily turn any Windows document into a flier or booklet. ClickBook is ideal for creating promotional or reference materials or presentation handouts.

This software is so easy to use, we printed a booklet in minutes. ClickBook provides many layout choices, including trifold brochures (three pages on one piece of paper), fold-up booklets, and flip-through booklets to be stapled. The program also sizes pages for Day Timer and DayRunner formats, printing pages with lines for you to cut along.

During installation, ClickBook asks which printer you want to use and loads that printer's drivers. From then on when you print, the list of printers will include the name of that printer, preceded by *CB* (ClickBook). To print with ClickBook, compose your document as usual in your Windows application. Then go to Printer Setup and choose the CB entry. When you choose Print, the ClickBook dialog box pops up.

The dialog box shows ClickBook layouts you can preview with your document. The program fits the pages to the layout and arranges them so the finished pages are in numerical order. Then you print.

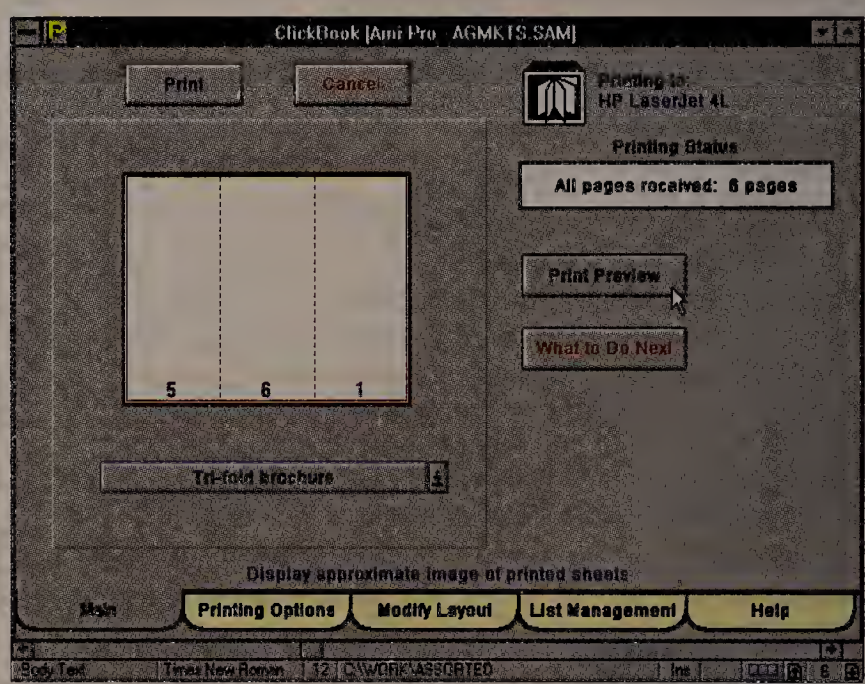
We made a fold-up booklet using our laser printer and an 8-page document. We chose a layout that prints two pages per side on two sheets of 8½-by-11-inch paper. (ClickBook reduces the pages to fit.) ClickBook prints on one side of each sheet. Flip the paper, reinsert it, and ClickBook does the other side.

Producing booklets with double-sided pages on a dot matrix printer requires a sheet feeder. You have to print one side, then separate the sheets and print the other side.

—Laurianne McLaughlin

ClickBook

WINDOWS This utility allows you to easily print any Windows document as a booklet or flier.
BookMaker Corp.
800/766-8531,
415/617-1101
List price: $69.95
Reader service no. 806

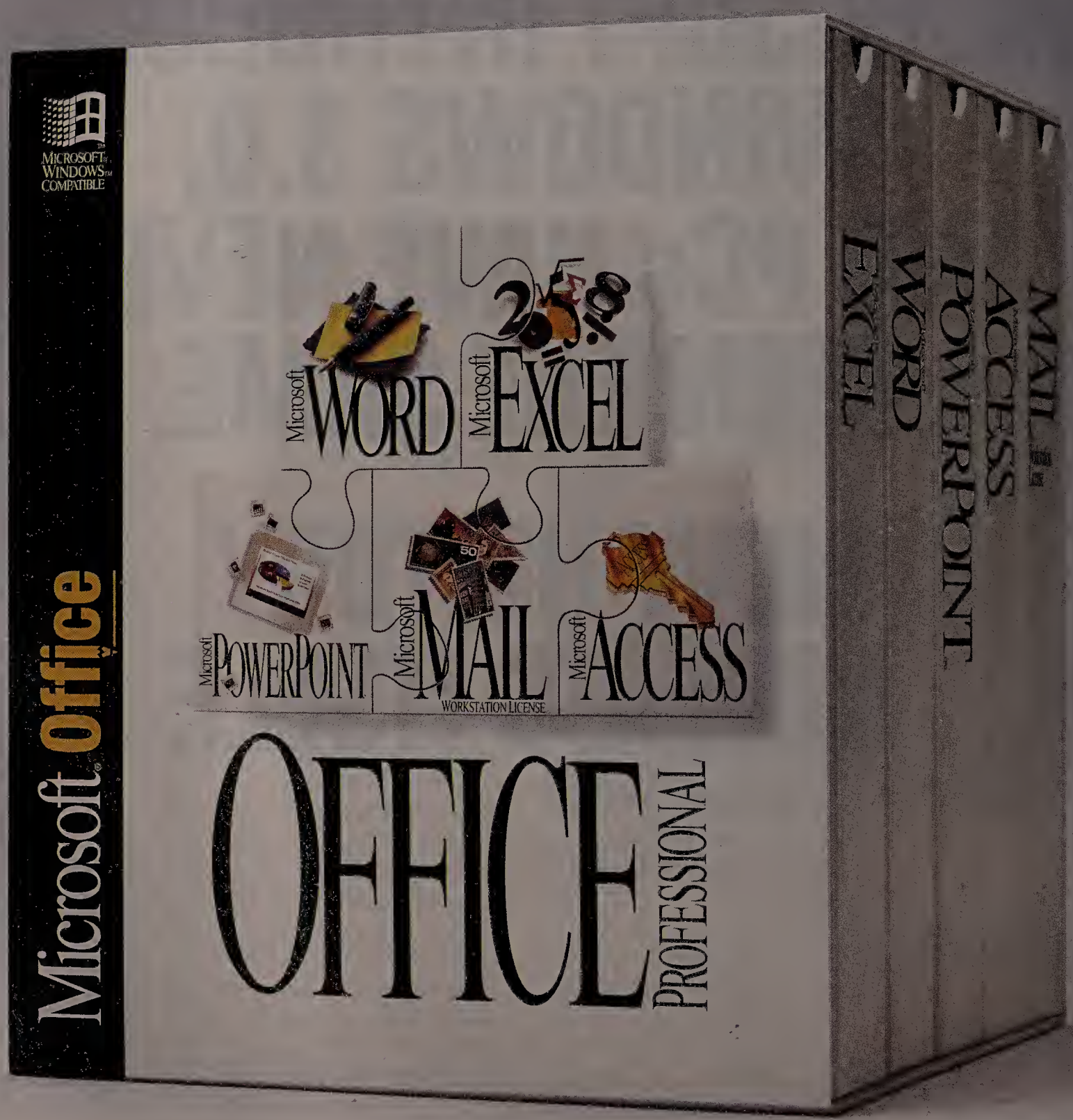


CLICKBOOK PRINTS ANY WINDOWS DOCUMENT as a booklet or flier. Its dialog box pops up in your application at print time.

IN 1990,
MICROSOFT INTRODUCED
WINDOWS 3.0,
AND PCs HAVE NEVER
BEEN THE SAME.

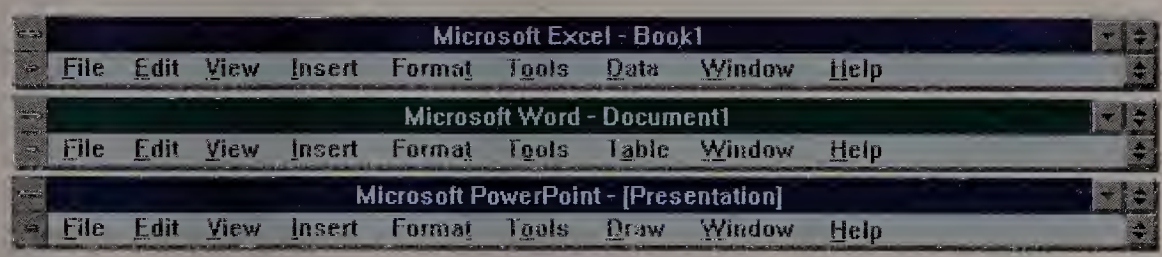
NOW HISTORY
REPEATS ITSELF.

INTRODUCING THE MICROSOFT OFFICE. A WHOLE NEW WAY TO WORK.



You asked for programs that work more like you do. And the new Microsoft® Office delivers on a level that software never did before.

We've gone right to the core of all our renowned programs for Windows™ and evolved them into a single, intelligent, effortless working environment. Now you can focus on your work, not your computer.



These menus from Microsoft Excel, Word and PowerPoint demonstrate a design consistency you'll also find in our toolbars, dialog boxes, and buttons.

You've helped us create all the best innovations.

The Microsoft Office couldn't have happened without a lot of concrete feedback from you. We've studied how you work and used your suggestions to develop great computing solutions. In our usability lab, 15 full-time scientists constantly watch how people use our products. In fact, we've tracked over 1.5 million user actions to understand just how you work with your computer.

Click on any icon in the Microsoft Office Manager and it instantly moves you from one program to another.

That's why Microsoft consistently pioneers better ways to work. And the new Microsoft Office continues in the tradition that brought you toolbars, wizards, automatic functions, and a lot more. Now your 100 most common tasks can be done in one step.

Working as one.

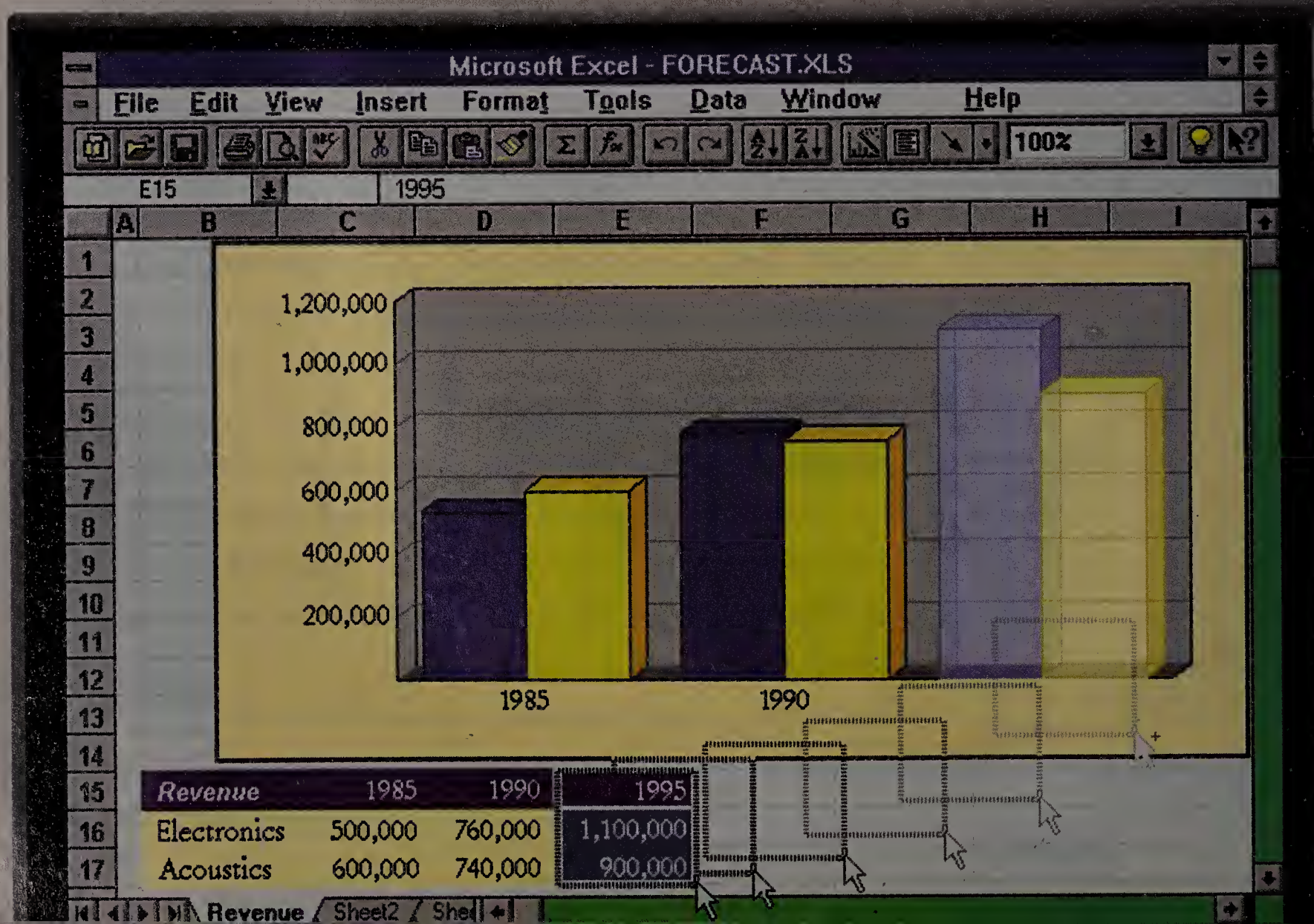
One of the main things you told us was that you want programs which look and work alike. So we made it happen.

For example, in the new versions of Microsoft Excel, Word and PowerPoint®, eight of the nine top level menu commands are the same.

And that's only the beginning. You can install the Microsoft Office in one integrated step and use the same shared tools like Microsoft Graph, WordArt and Spelling checker across all the programs. And the intuitive Microsoft Office Manager (MOM) makes it easy to use all these innovations together.

The Microsoft Office family of programs is the most popular office suite for the Windows and the Macintosh® operating sytems because it's built from the ground up by one company with one cohesive design philosophy. It all adds up to a whole new way to work.

ONLY THE MICROSOFT OFFICE HAS INTELLISENSE. BUILT-IN INTELLIGENCE THAT UNDERSTANDS WHAT YOU NEED AND HOW TO DO IT BEST.



With the Microsoft Office, IntelliSense™ technology has arrived. IntelliSense recognizes what you want to accomplish, adapts to the personal way you work, and delivers intelligent results. Now repetitive jobs are automatic, complex jobs are easier, and your computer is working much smarter.

SHip teh cartons friday.

Ship the cartons Friday.

The AutoCorrect feature in Word fixes typos as you make them. Automatically.

The basics are automatic.

Most everyday routines that you have to do, just to get to the real work, now happen automatically.

The exclusive AutoCorrect feature in new Word 6.0 instantly fixes typos as fast as you make them. That's one less thing to think about.

AutoFormat analyzes your document, instantly picks a format (or allows you to customize one) and makes your work look great.

In new Microsoft Excel 5.0, you can use the innovative AutoFilter to look quickly at different parts of your data, with the click of your mouse.

And the Drag and Plot feature lets you add a new row or column of data to your charts by simply dragging the information there. What used to take a number of steps now happens in one.

The TipWizard in Microsoft Excel tracks the way you work and offers bright ideas on how to save time.

Pictured at left, the Drag and Plot feature in Microsoft Excel enables you to update your chart instantly with new data. Just drag the new data and drop it into your chart.

Guiding. Informing. Thinking ahead.

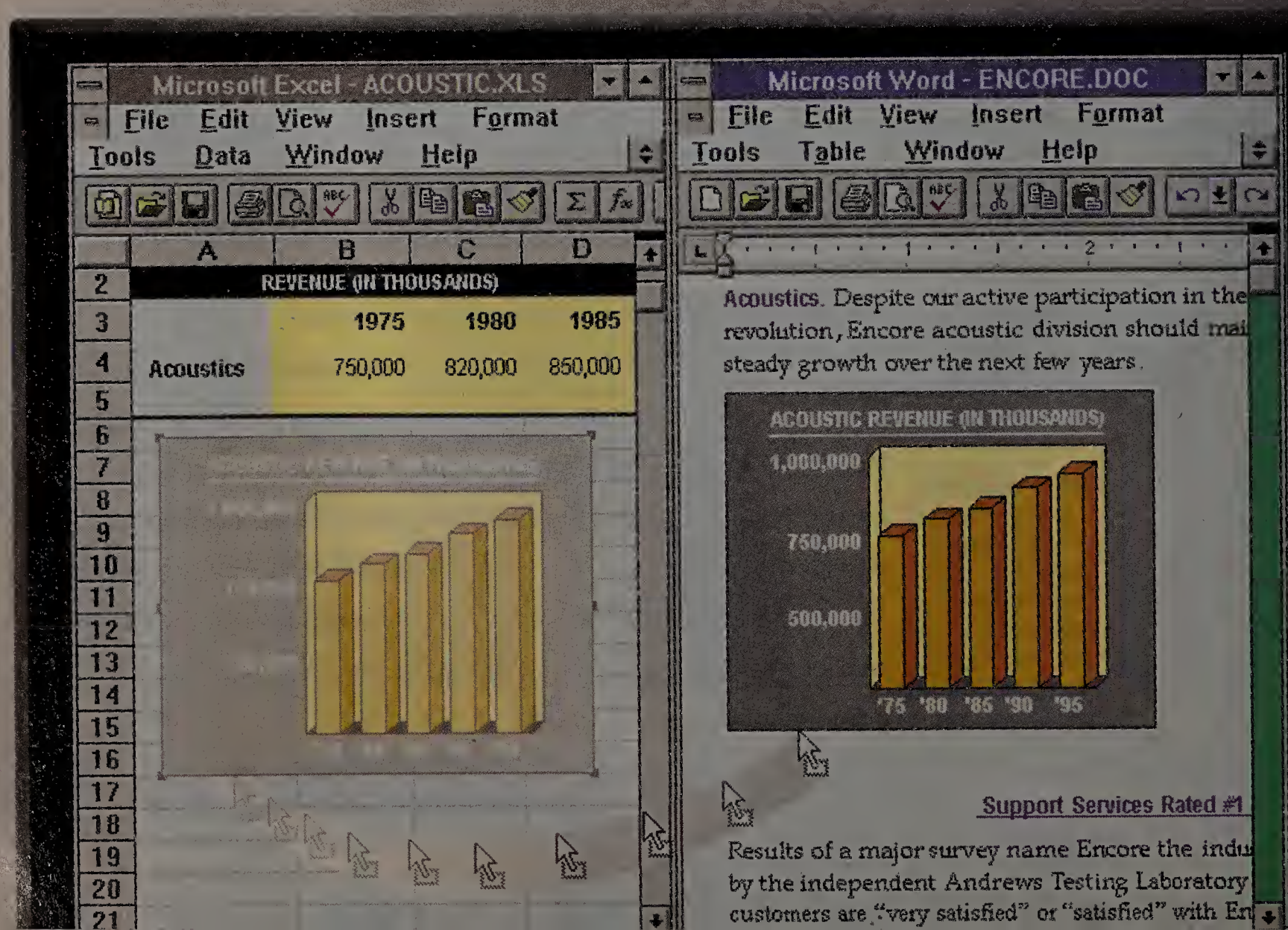
IntelliSense technology also means you have wizards and Cue Cards that inform you and guide you easily through more complex jobs like charting, designing presentations, customizing form letters, and creating data entry forms.

For instance, the TipWizard in Microsoft Excel observes how you work. Based on your individual patterns, it gives you tips on new ways to finish tasks with less effort. There's no easier way for you to discover how to reduce steps and save time. And avoid a trip to the manual.

The PivotTable Wizard guides you through building summary tables of your data. Now you can drag and drop your headings, then view and analyze your work from every angle.

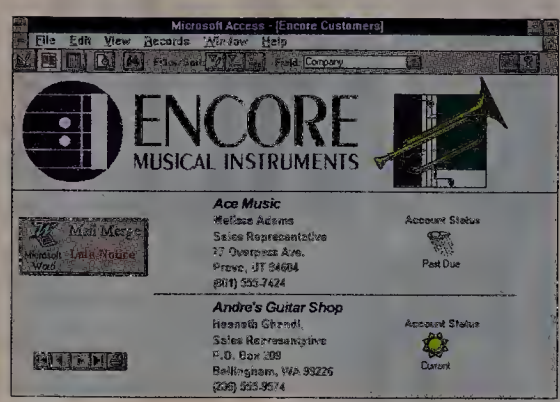
The powerful engineering in IntelliSense could only happen through our commitment to your ideas and to turning them into solutions you need. And only Microsoft can bring this much great thinking together all in one place.

ONLY MICROSOFT HAS OFFICELINKS. NOW IT'S SIMPLE TO SHARE DATA BETWEEN PROGRAMS WITHOUT LEAVING YOUR DOCUMENT.



New OfficeLinks makes it simple to share text, data, and graphics between programs, and lets you put them all together in the same document. You asked for innovation, and this delivers in a big way.

At the heart of OfficeLinks is



With OfficeLinks, it's effortless to mail merge your Microsoft Access data into a Word document. Lower right: Routing lets everyone in your workgroup share comments and information.

the latest Object Linking and Embedding technology (OLE 2.0). It's an open industry standard that helps everything in the Microsoft Office work together, even with software from other companies.

Drag and Drop between programs. Instantly.

Here's what moving information between documents is like: Drag a chart from Microsoft Excel and drop it into Word. Job done.

Hit the "Present It" toolbar button in Word, it'll automatically transfer your work to new PowerPoint 4.0 for an instant presentation.

Link data from Microsoft Access® with your Word document and you've got personalized letters for your entire customer base. Fast.

The end of jumping between applications.

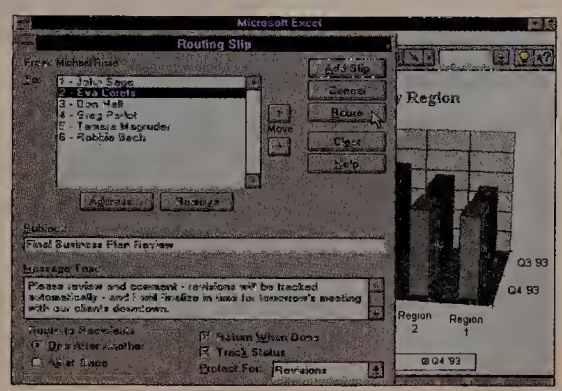
OfficeLinks lets you edit in place. In one place. Maybe you have a Microsoft Excel chart in the Word memo you're writing. And you need to change some figures. Click on the chart and instantly have all your spreadsheet tools to make the changes. Without ever leaving your Word document.

We call it Visual Editing. And once you've seen it in action, you'll understand just how integrated the Microsoft Office is. Moving, sharing and editing data between applications has changed forever.

Together in every way.

The Microsoft Office is bringing workgroups together, too. Your whole group can manage and edit documents as a team. Use the Routing feature to forward your draft, collect comments and merge the results.

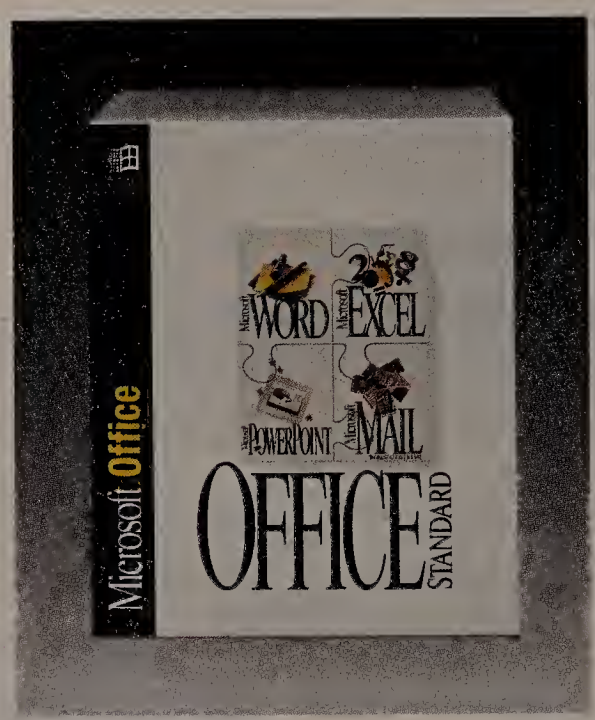
Only the Microsoft Office lets you share files and macros between the PC and Macintosh. And through Visual Basic™ for Applica-



Pictured at left, sharing data between programs is as easy as dragging it from one and dropping it into the other.

tions, the new Microsoft Office provides a powerful development platform for custom solutions.

GET THE NEW MICROSOFT OFFICE FOR $259. YOUR PC WILL NEVER BE THE SAME.



Until February 1, through a special offer for Microsoft customers, you can upgrade to Microsoft Office Standard, featuring Word 6.0, for $259. That's more than 30% off what you'd pay for these programs separately. If you're currently using competitive programs, get the Trade-up for only $299.

INTRODUCTORY OFFER

MICROSOFT OFFICE STANDARD EDITION VERSION UPGRADE $259*
If you are a licensed user of at least one qualifying Microsoft Office program.*

MICROSOFT OFFICE STANDARD EDITION TRADE-UP $299†
If you have a competitive spreadsheet, word processor, presentation graphics or database program.†

If you act now, you'll automatically get Microsoft Excel 5.0 and PowerPoint 4.0 upgrades at no extra cost as soon as they're released.**

The Microsoft Office Standard includes Microsoft Excel, Word, PowerPoint plus a Mail workstation license. When you buy Microsoft Office 4.0, you can add the award-winning Microsoft Access database for just $99†† by taking advantage of our special rebate offer.

FOR THE NAME OF YOUR LOCAL RESELLER OR TO ORDER BY PHONE, CALL (800) 894-6642.

Microsoft Office

*Offer for the Microsoft Office expires February 1, 1994. Qualifying Microsoft Office programs: Microsoft Excel, Word, the PowerPoint presentation graphics program or the Microsoft Access database management system. **Getting the Microsoft Office Standard edition Upgrade or Trade-up entitles the user to Microsoft Excel 5.0 and PowerPoint 4.0 versions upon their release. †Registered users of Microsoft Works and Microsoft Project also qualify for the Microsoft Office Standard Trade-up price. ††If you acquire the Microsoft Office 4.0 by February 1, 1994, you can get Microsoft Access for $129 (plus tax and freight) and receive a rebate of $30 off the purchase price. If you have a previous version of Office or competitive database program, you are eligible for the $129 special upgrade price. Rebate offer and special Microsoft Access price both expire March 1, 1994. All offers are good only in the 50 United States. In Canada: for information only, call (800) 563-9048. © 1993 by Microsoft Corporation. All rights reserved. Microsoft, Microsoft Access and PowerPoint are registered trademarks, and IntelliSense, Visual Basic and Windows are trademarks of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc.

Continued from page 124

Micrografx SnapGrafx: Charts for Charts' Sake

Your mother may think you're a great artist, but you know better. And creating even simple business charts and diagrams can be a nightmare if you have no idea how to begin. Fortunately, Micrografx's SnapGrafx 1.0 can give you a running start.

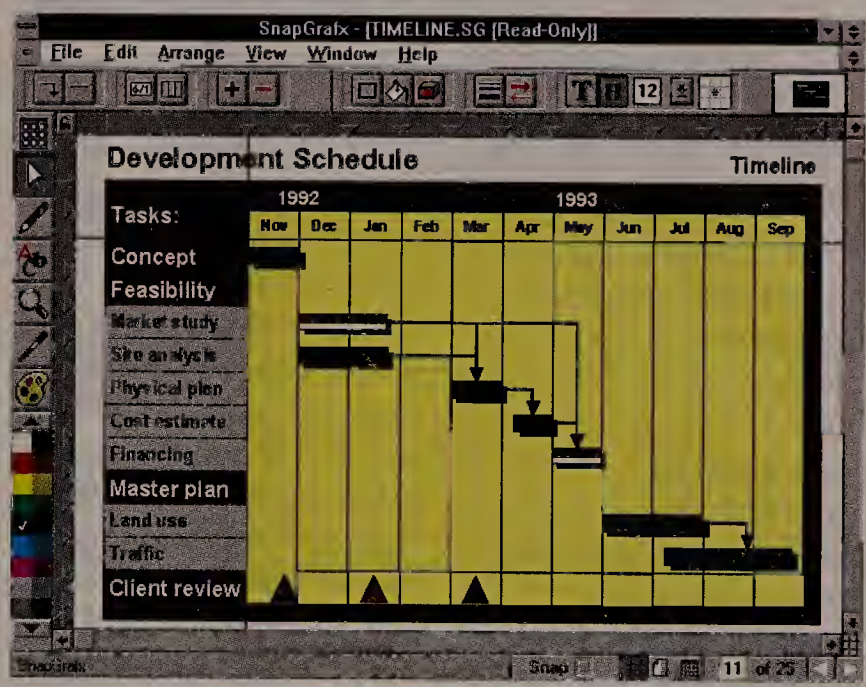
When you fire up the Windows-based package, you see a gallery of 20 chart templates—flow and organizational charts, comparison tables, pyramids, Venn diagrams, and more. Simply click on a template to call up a page of empty placeholders for adding objects, plus a floating toolbox of shapes specific to that kind of chart.

SnapGrafx sports a variety of geometric shapes and silhouettes of buildings, vehicles, and people. To build a chart, select a shape from the toolbox, then click on one of the placeholders—the chosen object appears instantly. You can resize or move the object, change its colors, add 3-D shading, connect it to other objects with lines or arrows, or type text inside it.

Don't know which kind of chart to use? Simply select the question-mark icon in the template gallery and click on a chart—up pops a window describing the chart and its uses. A Quick Tour button takes you through the process of creating basic to advanced charts.

Micrografx has deliberately kept SnapGrafx simple. Unlike Windows OrgChart or ABC FlowCharter, it can't store more information "beneath" the shapes—what you see is all you get. The program also lacks the add-on design libraries and sophisticated drawing tools of low-cost packages like Shapeware's Visio or Aldus's IntelliDraw. But for creating bread-and-butter business charts, SnapGrafx is, well, a snap.

—Daniel Tynan



SNAPGRAFX'S CHART TEMPLATES let you create organization charts, time lines, and other business diagrams with a few mouse clicks.

SnapGrafx 1.0

WINDOWS The easy way to create flowcharts, tables, and other basic business graphics.
Micrografx Inc.
214/234-1769,
214/994-6475 (fax)
List price: $295, Introductory price $99 through December
Reader service no. 805

QuickFind: An Inexpensive Windows File Manager

Having recently switched from the Macintosh to Windows, I've been forced to cut my narrative short where file names are concerned. 'The Wishing Window—Outline', for example, now reads 'WWOUT-.DOC'. Inventing those little tongue twisters isn't so tough, but trying to remember what they stand for a few days later can quickly cause brain cramp.

To the rescue—sort of—is QuickFind from View Software. Eclipsing the Mac's 32-character capacity, QuickFind allows a rambling 255 characters for naming files. But there's a hitch: Unlike the Mac, which handles long file names everywhere—from its desktop to applications' Open and Save dialog boxes—QuickFind supports long file names only within applications. There's another hitch: QuickFind currently works only with Microsoft Word for Windows and Microsoft Excel. View Software promises it will soon support more applications, including WordPerfect, 1-2-3, Lotus Improv, and Microsoft's PowerPoint, Access, and Works.

After installation, QuickFind loads whenever you start Windows. To create a long name for a Word file, you choose File• Save As, just like always. QuickFind replaces Word's Save As dialog box with its roomier version. As you type in a long file name, QuickFind abbreviates it to an 8-character DOS-compatible name (you can rename this). This alias appears in File Manager, while the longer QuickFind description appears in Word's Save As and Open dialog boxes.

QuickFind has a small database to keep track of long file names and their corresponding DOS files. Double-click QuickFind Manager (the background program that loads at start-up) to access QuickFind separately to create, rename, and delete long file and directory names.

QuickFind

WINDOWS A document manager that lets you give Excel and Word for Windows file and directory names of up to 255 characters.
View Software Inc.
415/856-8439,
415/858-2563 (fax)
List price: $49.95
Reader service no. 804

This little utility makes naming and managing files easier for those who work with lots of Word and Excel documents. It would be great if the program could support long file names throughout, the way that the Macintosh does. But this isn't QuickFind's fault: Windows can't handle long file names until it parts from DOS and its 8-character file name limit. Meanwhile, QuickFind eases the pain just a little, at a little price—$49.95.

—Joe Hutsko

QuickBooks Simplifies Small-Business Bookkeeping

QuickBooks 2.0 for Windows, QuickBooks 2.0 for DOS

WINDOWS Small-business bookkeeping software that creates invoices and prepares checks.
Intuit
800/624-8742, 415/322-0573
List price: $159.95; bundled with QuickPay payroll $199.95; rebate from Intuit of $45 for QuickBooks upgraders or $25 for Quicken users

If you need to track finances for a small business, but don't know the difference between a debit and a credit, Intuit's QuickBooks may be the bookkeeping program for you. It's the accounting program for nonaccountants working at businesses that have 20 or fewer employees.

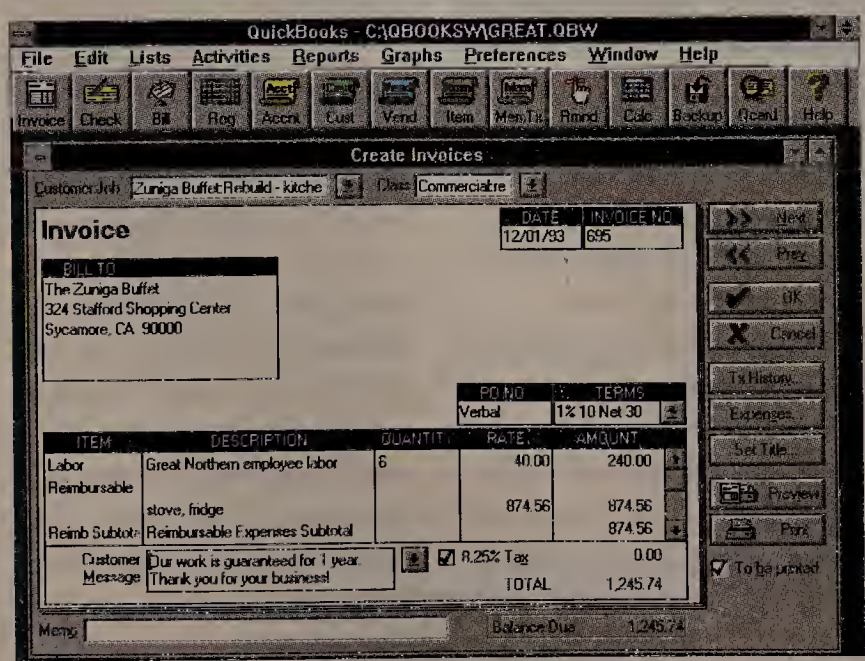
QuickBooks is now available for both DOS and Windows. The Windows version has a few more capabilities, including more than 50 standard financial reports, compared to just over 20 in the DOS version. In addition, QuickInsight graphs, which take snapshots of your financial status, are available only in the Windows program.

If you like Quicken you'll love QuickBooks 2.0 for Windows. The product retains much of the personal finance program's look and feel, including the handy QuickFill feature that automatically completes the names and addresses of customers and suppliers.

The bookkeeping program focuses on paying your bills and invoicing your customers, and these processes automatically create the financial statements. There's no need to post to ledgers, as you have to do with other accounting packages.

QuickBooks can prepare invoices for products and services. The program is best suited for a service business, however, since it doesn't keep track of inventories—a critical feature for most businesses that distribute products. The Windows version of QuickBooks has enhanced project tracking. The program is perfect for construction firms or small manufacturers that build to order. Although QuickBooks is simple, it includes some handy features that many high-end accounting programs lack, such as the capability to charge an expense to a customer or automatically prepare a customer's refund check. For start-up accounts you can select from 21 charts designed for different types of companies including law firms, consulting companies and religious organizations. Or you can easily modify a chart to fit your business. The program can keep your books either on a simple cash basis or on the more accepted accrual method.

—Richard Morochove



CREATING INVOICES IS A SNAP with QuickBooks 2.0 for Windows.

Norton Desktop for Windows 3.0

The latest version of Symantec's Norton Desktop for Windows adds a personal information manager and an E-mail manager to its portfolio of utilities. These two new tools are solid little programs that make Norton Desktop a good value at $179, or $49 for an upgrade. Moreover, they could help the program pull away from its archrival, Central Point Software's PC Tools for Windows, which has no PIM or E-mail manager.

We found Norton Desktop's new full-featured PIM, Day Planner, as easy to use as Lotus's venerable Organizer. Day Planner offers an appointment calendar, an address book, a to-do list, and a customizable interface with daily, weekly, and monthly views. Day Planner's drag-and-drop rescheduling and reminders add to its ease of use.

The new Mail Central lets you send, receive, and work with E-mail messages from a variety of sources on one screen. For example, you could store messages from VIM-compatible E-mail packages such as cc:Mail and online services such as CompuServe and MCI Mail in a single mail directory. Symantec says you can schedule Mail Central to dial online services and download E-mail messages automatically at scheduled times. (This feature didn't work in the beta copy we evaluated.)

File Viewer lets you view files without loading their respective applications and now works with 80 file formats.

Norton Desktop's shell, which replaces your Program Manager and File Manager, now lets you create file names with more than eight characters. The backup feature supports QIC-40 and QIC-80 tape drives and SCSI devices. Norton Disk Doctor for Windows supports compressed drives and works with hard drives up to 2GB.

—Laurianne McLaughlin

Norton Desktop for Windows 3.0

WINDOWS The newest Norton Desktop packs serious power and new features, led by a personal information manager, an E-mail manager, and a powerful File Viewer.
Symantec Corp.
800/441-7234, 310/453-4600
List price: $179, upgrade $49
Reader service no. 798

One-Stop Mail Drop for Windows

Connect Software's E-Mail Connection, Computer Mail Services' MailPlus

WINDOWS These two Windows communications packages let you access multiple E-mail services.

Connect Software
800/234-9497,
206/881-8251
List price: $99.95
Reader service no. 711

Computer Mail Services
313/352-6700,
313/352-8387 (fax)
List price: $99.95
Reader service no. 712

Electronic mail is rapidly becoming the best way to stay in touch with business associates. Using your office E-mail in combination with a variety of mail services such as those offered through MCI Mail, CompuServe, and Internet, you can send and receive messages from work, home, or the Hilton.

That's the good news. The bad news is that managing all these E-mail services can be a pain. Logging on to each service, uploading and downloading messages, remembering arcane E-mail addresses—isn't there an easier way?

Well, there is now, with two new communications programs that promise to simplify your E-mail chores. E-Mail Connection from Connect Software and MailPlus from Computer Mail Services are Windows-based front ends that provide a single interface for your E-mail services. Both programs let you automate tedious communications tasks, such as downloading mail, and save you money by letting you compose, read, and store messages offline.

E-Mail Connection

Install this $99.95 program the same way you would any Windows communications package. After choosing your communications settings (modem type, speed, COM port, and so on), you set up the E-mail systems you'd like to use. For instance, if you're a member of CompuServe, click the CompuServe icon and enter your user ID, your password, and the number for local modem access. The last step is to click the Schedule icon and choose the time and day (or days) of the week that E-Mail Connection should log on to CompuServe. The program's background pattern is a bit-map image of 8 different postage stamps. If this seems a bit strange to you, you can always replace it with a BMP image of your choice.

The program automatically retrieves all mail messages from your online service. In addition, it uploads messages you create with E-Mail Connection. An Address Book icon gives you quick access to E-mail addresses, and you can store messages in folders as well as in your in-box or out-box.

E-Mail Connection provides mail gateways to MCI Mail and CompuServe and to MAPI- and NetWare MHS–compliant E-mail packages such as Microsoft Mail and Da Vinci eMail. (Future releases will likely support VIM-compliant Lotus cc:Mail and additional online services.) The product also creates and maintains a log file for each electronic-mail system that you use, listing connect times, messages received, message senders, the time messages were sent, and the time they were received. Log files can also help you to keep track of your online charges.

EASY MAIL ACCESS: E-Mail Connection automatically retrieves your electronic-mail messages from the office LAN and online services such as CompuServe and MCI Mail.

MailPlus

Also designed as your one-stop E-mail shop, Computer Mail Services' $99.95 MailPlus supports only MCI Mail; however, the program's next release will support CompuServe (and eventually other online services and LAN E-mail), the company says. MailPlus features a scheduler, an address book, and a message folder. Each component is easily accessible via the program's Desktop interface.

To set up your MCI account, click the MCI icon and use MailPlus's drop-down menus to input your modem settings, account number, and password. The program's Scheduler lets you automate E-mail downloads, and you can store messages in folders. MailPlus scans incoming messages' sender and subject lines for keywords, so you can organize your messages intelligently. For example, use your Expenses folder to store all those messages with subject lines that read "budget" and "forecast."

One of MailPlus's nicest features is its Address Book, which automatically adds the E-mail addresses listed in incoming messages. If you have ever received an MCI message via Internet, you know that a sender's address is often a confusing string of characters that's nearly impossible to recall when you need it. By adding these addresses to your address book, MailPlus automates one of the most tedious E-mail tasks.

MailPlus can automatically copy a message with multiple addresses and send out copies on different E-mail services—handy for sending form letters. However, since the first release of MailPlus supports only MCI Mail, you'll have to wait for an upgrade to use this feature.

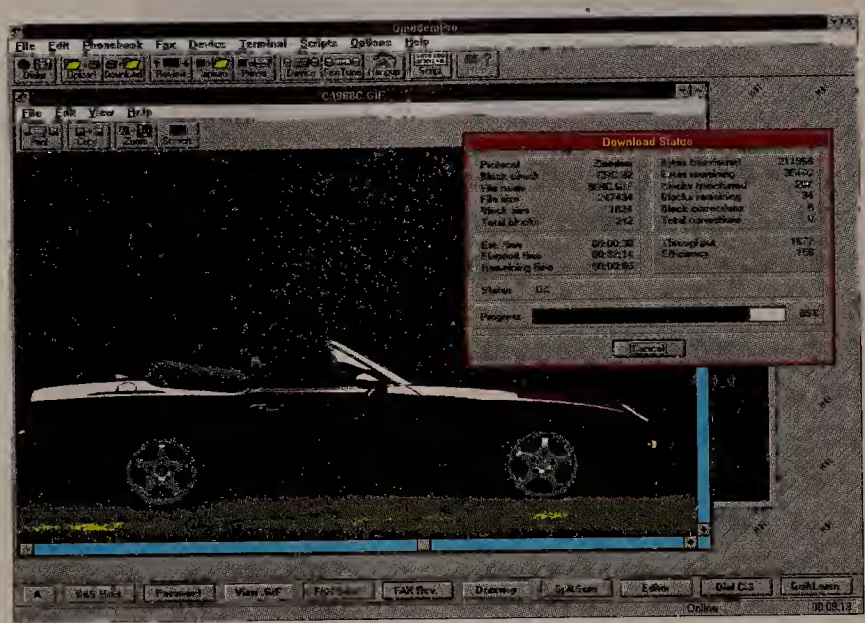
While both MailPlus and E-Mail Connection need to beef up their access to online services and LAN E-mail programs, they're worth a look if you're a dedicated E-mail user.

—Jeff Bertolucci

Windows Version of QmodemPro Debuts

Mustang Software has upgraded and improved its popular telecommunications package, QmodemPro, enhancing the DOS version and adding a Windows release to the stable.

QmodemPro 1.51's new features simplify and automate handling E-mail from multiple sources. Many people now use more than one electronic information service, and these days you may have to log on to three or four services to read and answer all your mail. QmodemPro 1.51 simplifies those tasks by providing a "gateway" called QMGate that allows you to send and receive messages quickly and easily using several online services simultaneously.



SIMPLIFY ONLINE TASKS with the first Windows version of QmodemPro, which brings all your messages and downloads to one interface.

With QMGate, you create a single command that causes QmodemPro to connect with a specified list of online services and download all relevant messages. For example, you can specify MCI Mail, CompuServe private E-mail, and even multiple CompuServe forums. All messages are brought under one common interface, a powerful but easy-to-use offline reader called Off-Line Xpress (OLX). You read and answer your messages offline, reducing long-distance charges. When you're done, QmodemPro sorts and directs your responses to the right place on the correct service. Or you can forward messages from one service to another.

Qmodem Pro for Windows incorporates send and receive fax capabilities, 33 terminal emulations, and the new compiled Script Language Interface for QmodemPro (SLIQ). Although you can create scripts automatically using QmodemPro's QuickLearn capability, you can also call on the program's powerful built-in script editor and debugger. QmodemPro for Windows requires 4MB of RAM.

—Jim Moody

QmodemPro 1.51, QmodemPro for Windows

WINDOWS Mustang Software adds electronic-mail features and a Windows version to its communications package.
Mustang Software
805/395-0223
List price: DOS version $99, Windows version $139
Reader service no. 808

Fastest Modems Become Affordable, Use Parallel Port

Microcom's new 28.8-kilobits-per-second (kbps) modems are the first to offer this level of performance at affordable prices. At $499, the DeskPorte Fast desktop model and the TravelPorte Fast portable cost about half as much as comparable products. They also use the parallel port to provide 115.2-kbps throughput without an accelerator card.

These modems rely on a Rockwell International chip set, which uses a proprietary modulation scheme for 28.8-kbps communications known as V.Fast Class, or V.FC. Though V.FC is not a standard, it has been embraced by more than 100 modem vendors. V.FC products from different vendors are expected to be able to communicate with each other at 28.8 kbps. For communicating at lower speeds or with non–V.Fast Class modems, the Microcom products support slower, popular modulation standards such as V.32bis, V.32, V.22, V.22bis, and others.

The Microcom modems are upgradable and should be compatible with a pending international standard for 28.8-kbps communications. The vendor plans to offer a do-it-yourself upgrade for $39.

Microcom's modems attach to the parallel port instead of the slower, less reliable serial port. Standard serial ports can lose data when operating at high speeds with Windows communications programs.

Other important features of these two Microcom modems include V.42 and MNP-10 error correction, which let them communicate over noisy connections, such as those that are common on cellular networks. Indicators that tell you about your connection enable you, for example, to terminate a less-than-optimal hookup and then try your call at another time. The desktop model includes an LCD screen and LED lights. The 8-ounce portable model, which is about the size of a pack of cigarettes, offers LED lights only. Both of these modems support 9.6-kbps fax transmission and include SofNet's FaxWorks 3.0 software.

—Randy Ross

DeskPorte Fast and TravelPorte Fast modems

Two of the first modems to offer 28.8-kbps performance at modest prices.
Microcom
800/822-8224
List price: DeskPorte Fast $499, TravelPorte Fast $499
Reader service no. 807

"We were blown away by the Micro Express, which beat its nearest competitors by a fantastic 24 percent margin"

PC WORLD

PC WORLD BEST BUY

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PC MAGAZINE EDITORS' CHOICE

BUYERS ASSURANCE SEAL RECOMMENDED PRODUCT

THE PC/COMPUTING 200 BEST PC PRODUCTS 1992

ME 486DX2/66

"Our top overall value, the Best Buy Micro Express ME 486-VL/DX2/66, is a 66-MHz local bus machine with the fastest performance overall... Furthermore, the company's service and support topped the chart, just as it did in June.

"It's no surprise that 486DX2s are the quickest machines... but we were blown away by the Micro Express, which beat its nearest competitor by a fantastic 24 percent margin."

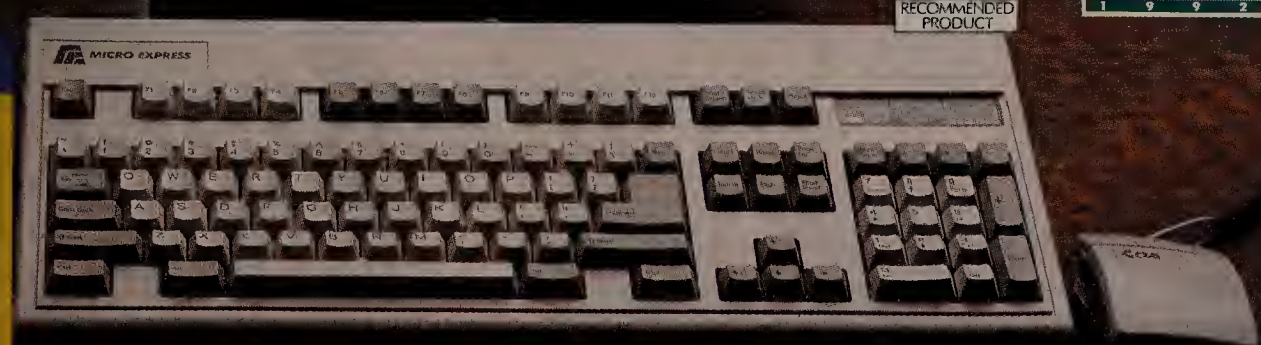
PC World, August 1993

"...with its superior product warranty and support, and outstanding processor speed, it also reflects...quality and exceptional engineering that could propel Micro Express to become a major player in the computer industry."

Computer Buyer's Guide, January 1993

"The Micro Express ME 486-Local Bus/DX2/66 has the lowest price of the bunch. This system showed itself to be a fine performer...."

InfoWorld, November 16, 1993



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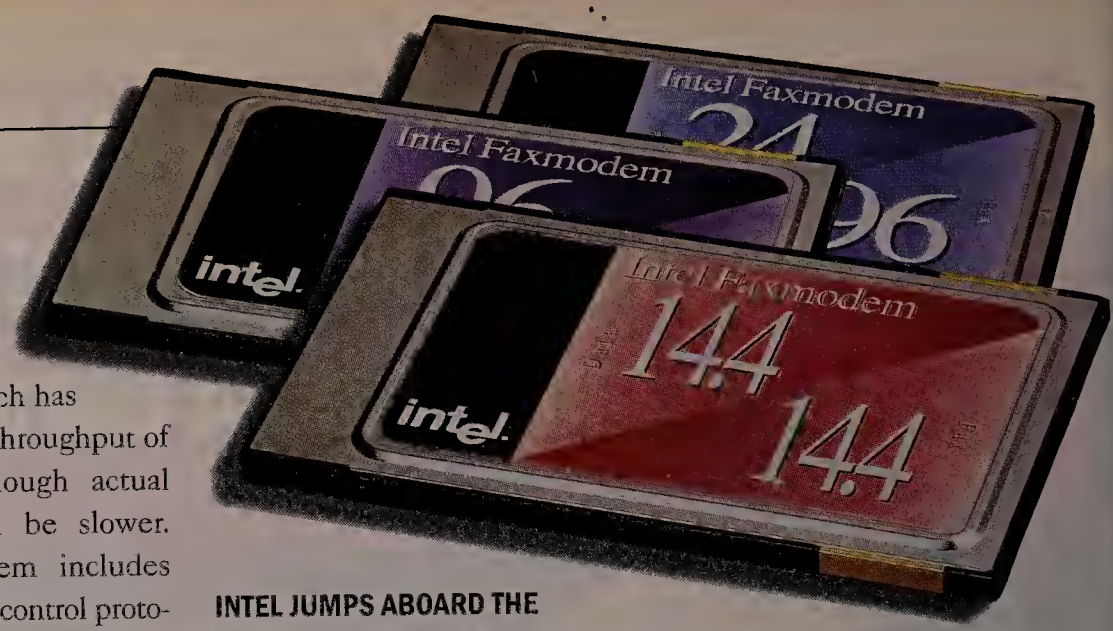
Prices and specifications are subject to change without notice.

Circle 157 on reader service card

Intel PCMCIA Modems



INTEL JUMPS ABOARD THE PCMCIA BANDWAGON with three new Faxmodems at street prices starting under $300.

Sure, Intel is known for its microprocessors, but it's also one of the biggest names in the modem business. The company's SatisFaxtion fax-modems have earned a reputation for quality and reliability. Now Intel is introducing three PCMCIA fax-modems at street prices starting under $300. Intel's PCMCIA Faxmodems are built to fit in any 5mm Type II slot, as well as in larger Type III slots. Intel's Card Manager software allows you to insert and remove a Faxmodem while Windows or DOS programs are running—useful if your computer has only one PCMCIA slot and you need to swap your modem and LAN cards, for instance. Each Faxmodem includes built-in power management software with a sleep mode and a feature that turns on the modem when there's an incoming call. Telephone adapter circuitry is built in to Faxmodem, which comes with a six-foot cable to connect to standard phone jacks.

The top-of-the-line PCMCIA Faxmodem 14.4/14.4 sends and receives faxes and data at 14,400 bits per second (bps). It includes V.42bis for 4-to-1 data compression, which has a maximum data throughput of 57,600 bps—although actual performance will be slower. This $399 modem includes MNP-10, an error control protocol useful with cellular telephones. However, you'll still need a cellular adapter to connect your Intel Faxmodem to your cellular phone.

Priced at $379, the Faxmodem 96/96 offers 9600-bps throughput for faxes and data. At the low end, the $299 Faxmodem 24/96 offers data transfer speeds of 2400 bps and fax speeds of 9600 bps. Unlike the Faxmodem 14.4/14.4, these models don't support MNP-10.

Each Faxmodem includes DOS and Windows versions of Intel's Faxability Plus fax software and HyperAccess Lite, a scaled-down version of Hilgraeve's popular communications package. Intel offers a three-year warranty and 24-hour, seven-day tech support.

—Jeff Bertolucci

Intel PCMCIA Faxmodems

These three credit-card–size fax-modems include Windows and DOS fax and communications software.
Intel Corp.
800/538-3373,
800/629-7580 (fax)
List price: Faxmodem 14.4/14.4 $399, Faxmodem 96/96 $379, Faxmodem 24/96 $299
Reader service no. 713

Chameleon Opens Windows on the World

Chameleon NFS lets Windows users easily tap into UNIX networks, including mainframe-, minicomputer-, and PC-based LANs, WANs, and even services such as the Internet. This $495 program takes the hassle out of navigating UNIX networks by letting Windows speak UNIX protocols. As a result, you interact with Windows' familiar point-and-click metaphors instead of the UNIX command line.

Chameleon has been available since 1990, but it's only in this latest revision that it offers complete access to the Internet. This global communications network is rapidly gaining momentum in the business world, with more than 1600 commercial networks now connected (an increase of more than 300 percent over last year). An estimated 15 million people now use the Internet in some capacity, but the level of access can vary widely; the most limited access is the simple ability to send E-mail, which you now can do from most commercial online services such as CompuServe and MCI Mail. The next level is an interactive account that lets you download files. Finally, and best of all, there is on-demand interactive access, which is what Chameleon provides.

While access to the Internet may be the most exciting benefit, Chameleon is also attractive because it lets your Windows machine seamlessly access any LAN or WAN based on the TCP/IP communications protocol, which has gained popularity due to its ability to work with UNIX. In addition to UNIX, TCP/IP is also compatible with OS/2 and DOS machines, as well as big corporate iron. Chameleon's TCP/IP compatibility represents a major advance in the ability of Windows machines to participate in networks. And LAN users need not abandon their DOS-based networks: An add-on called IPX/link lets Chameleon run alongside Novell's NetWare.

Chameleon NFS

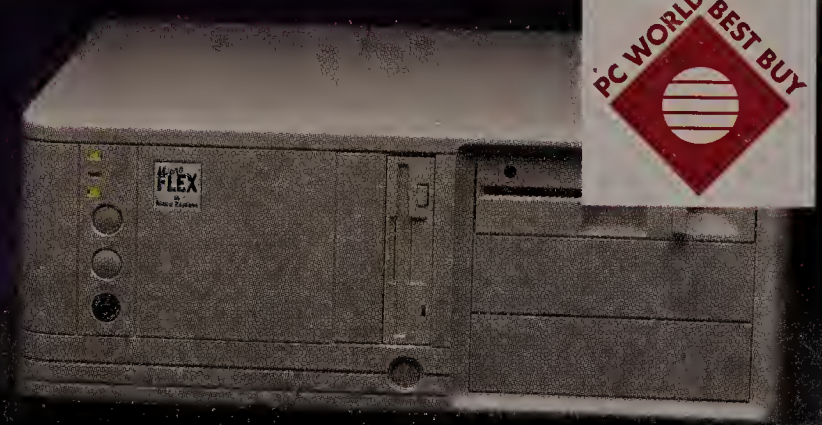
WINDOWS Chameleon NFS lets Windows machines interact seamlessly with UNIX networks, including the global Internet.
NetManage Inc.
408/973-7171
List price: $495, upgrade $95
Reader service no. 714

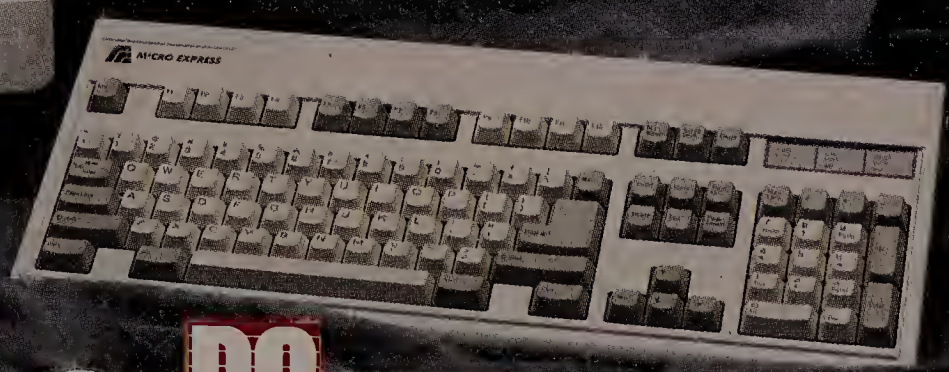
Though some knowledge of UNIX is helpful, it's not necessary. (A good companion book would be *The Whole Internet User's Guide and Catalog*.) Chameleon provides a Windows dialog box for each action on a UNIX network—such as gaining remote access to files, interacting with the thousands of special-interest Internet news groups, using E-mail, and more. And the software is designed for Windows users, not UNIX wizards. We found the manual accessible and tech support more than adequate.

—Joe Abernathy

"Overall, this is the best low-cost PC we've ever reviewed – bar none!"

PC WORLD





ME 486DLC/40

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PC World, June 1993

"The Micro Express ME 486DLC/40 posted the fastest speed results..."

InfoWorld, February 8, 1993

"We've always been impressed with the great value that Micro Express systems offer, and this latest 486 upholds that tradition...It's a great machine at a great price."

Computer Buyer's Guide, February 1993

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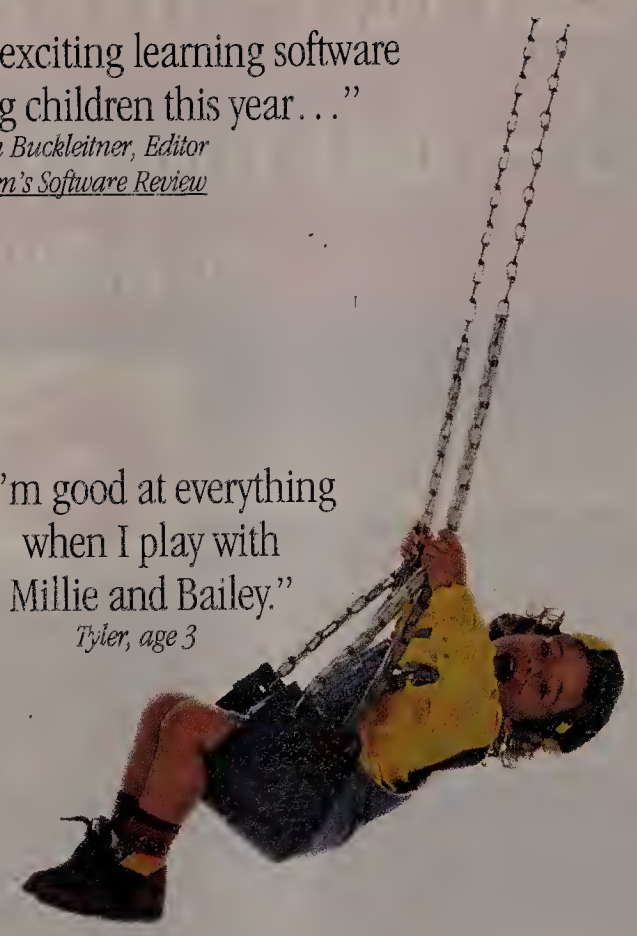

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Tyler, age 3

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Quick Takes

Edited by Jeff Bertolucci

Spectra-Star Printers

High-quality thermal transfer color printing is getting easier and more affordable. Two cases in point: the fast new Spectra-Star GT, which can print on plain paper, and the Spectra-Star Q10E, which, thanks to a recent price cut, is now one of the least expensive thermal transfer printers on the market. The Spectra-Star GT uses a 33-MHz Intel 80960CA RISC processor and a new ribbon technology to boost print speeds to 2 pages per minute (other plain-paper thermal transfer printers are doing well if they can crank out more than 1 ppm). For a list price of $4495, the GT gives you PostScript Level 2, 6MB of RAM, and 52 fonts. The older Spectra-Star Q10E, which comes with PostScript Level 2, 6MB of RAM, and 21 fonts, now lists for $2999—$800 less than it cost previously and at least $1000 less than most of the competing models. General Parametrics, 800/223-0999, 510/524-3950.

Reader service no. 687

Tri-CAD

Tri-Star Computer's new Tri-CAD tower may be the ultimate multimedia PC—at least for now. Built with high-performance components, the Tri-CAD is optimized for use with demanding graphics programs. In addition to a 66-MHz 486-DX2 processor, a 256K secondary cache, and 8MB of RAM, the Tri-CAD includes the Matrox Graphics Accelerator (MGA), a local bus video card that is among the first to use a speedy 64-bit internal data path. The Tri-CAD comes with a 17-inch MAG MX117F color monitor, a Sound Galaxy NX 16-bit stereo card, and a pair of Altec Lansing ACS300 speakers. Other impressive features: a Tekram local bus hard drive controller with a 4MB cache; a dual 340MB removable hard drive; a double-speed Texel DM-3024 CD ROM drive; a combination 5¼-inch, 3½-inch floppy drive; and a Microsoft Mouse. The Tri-CAD costs $6095. Tri-Star Computer Corp., (800) 473-8868.

Reader service no. 686

PrintCache 3.1

If you're tired of waiting for your Windows documents to print, check out the newest version of PrintCache. This utility replaces Windows Print Manager and can boost print speeds by up to 50 percent, according to the vendor. Version 3.1's new drag-and-drop feature lets you print by dragging files to the PrintCache icon. New Windows icons and DOS pop-up boxes provide printer status reports and error messages. If your PC has a sound card, PrintCache will produce audible signals. PrintCache also supports the HP LaserJet 4's high-speed serial port and two-way communications (to alert you when your printer's out of paper, for instance). PrintCache lists for $99.95, with an estimated street price of $29 to $39. LaserTools, 800/767-8004, 510/420-8777.

Reader service no. 694

Message Port

Instead of dedicating a fax-modem and phone line to each user, Nuko's Windows-based Message Port lets users share a single modem or pool of modems attached to the LAN. Message Port is essentially the software half of a fax/data server. Since any Windows-capable PC on your network can oper-

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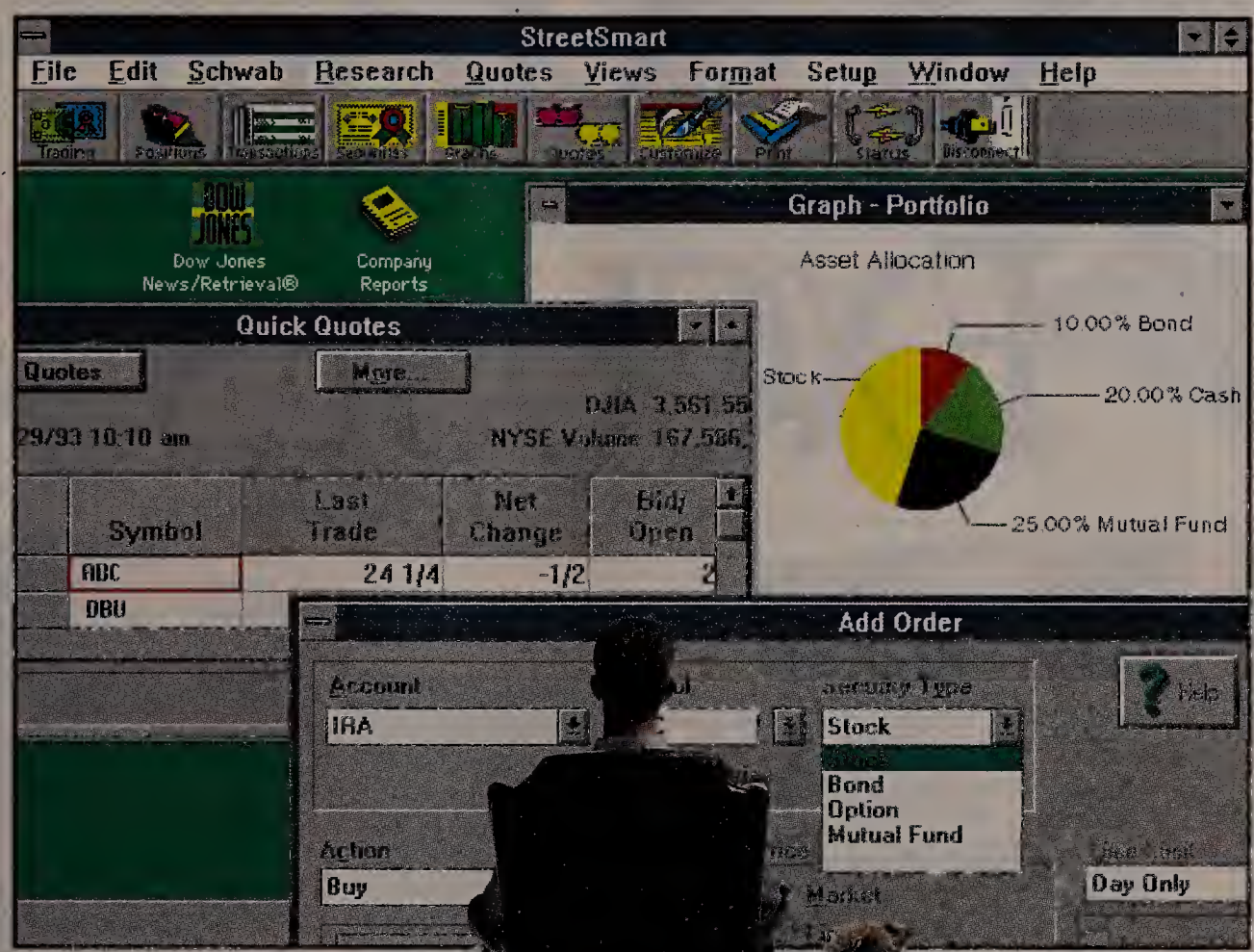

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Creative VoiceAssist™ software and microphone provides voice-activated Windows control for Sound Blaster 16 Multi-CD and SCSI-2 packages.

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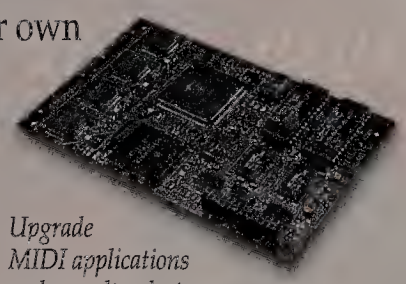
and get your Sound Blaster 16, upgrading to Wave Blaster™ Sampled Wave Synthesis (courtesy of the MIDI wizards at E-mu) or our own Advanced Signal Processing option (a Creative Labs exclusive) is literally as easy as adding a daughter board or plugging in a chip.



Upgrade MIDI applications and soundtracks to Sampled Wave Synthesis with a Wave Blaster daughter board.

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	Sound Blaster 16 Basic Edition	Sound Blaster 16 MultiCD	Sound Blaster 16 SCSI-2
Format	16-bit stereo	16-bit stereo	16-bit stereo
Advanced Signal Processing Upgradability	Yes	Yes	Yes
Wave Blaster Upgradability	Yes	Yes	Yes
CD-ROM Compatibility	Creative Labs/Panasonic	Sony, Mitsumi, Creative Labs/Panasonic	Any SCSI or SCSI-2
Bundled Hardware		Microphone	Microphone
Bundled Software	Monologue for Windows Creative WaveStudio Creative Soundo'LE Creative Talking Scheduler Creative Mosaic	Software Toolworks Multimedia Encyclopedia HSC InterActive SE PC Animate Plus Monologue for Windows Creative WaveStudio Creative Soundo'LE Creative Talking Scheduler Creative Mosaic Creative VoiceAssist	Software Toolworks Multimedia Encyclopedia HSC InterActive SE PC Animate Plus Monologue for Windows Creative WaveStudio Creative Soundo'LE Creative Talking Scheduler Creative Mosaic Creative VoiceAssist
Suggested Retail	$199.95	$249.95	$279.95
W/Advanced Signal Processing	Not applicable	$299.95	$329.95

Sound BLASTER™ THE 16-BIT SOUND STANDARD. CREATIVE™
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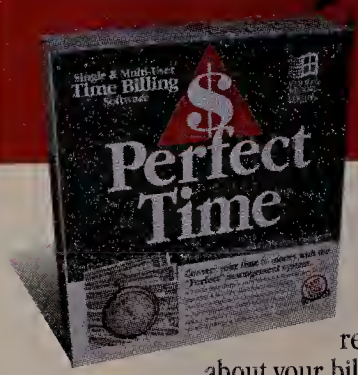
Circle 7 on reader service card

It's the Perfect Time to Improve Your Billing System!



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Customize client bills with minimal or complex detail. Group time or expense slips by client and activity, then subgroup them by matter/ project or employee/user. Write, taxable or non-taxable billings, up or down by using percentage or flat dollar amounts. Bill time by client, employee/user, activity or fixed amount. Flag expenses for specific markup percentages. Record time and expenses for 4000 employees/users. And track up to 4000 clients, each of whom might have 4000 matters/projects. Plus, export to any program that imports .QIF files, so no costly additional modules are required to link data to programs such as Pacioli 2000, Mondial™ or Quicken®.

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Circle 147 on reader service card

ate as the Message Port server, you're not compelled to buy a dedicated piece of hardware (as is the case with most fax/data servers). At $10 to $20 per client (depending on the number of nodes), Message Port is considerably cheaper than most fax/data systems. Message Port supports nearly all mail packages, including Lotus, cc:Mail, Microsoft Mail, and other VIM-, MAPI-, and MHS-based systems. Message Port runs on NetWare, Windows for Workgroups, LANtastic, and LAN Manager networks. The fax portion of Message Port requires a Class II fax-modem. The product costs $40 for 2 users, $199 for 10 users, and $398 for 20 users. Nuko Information Systems, 408/262-2225.

Reader service no. 688

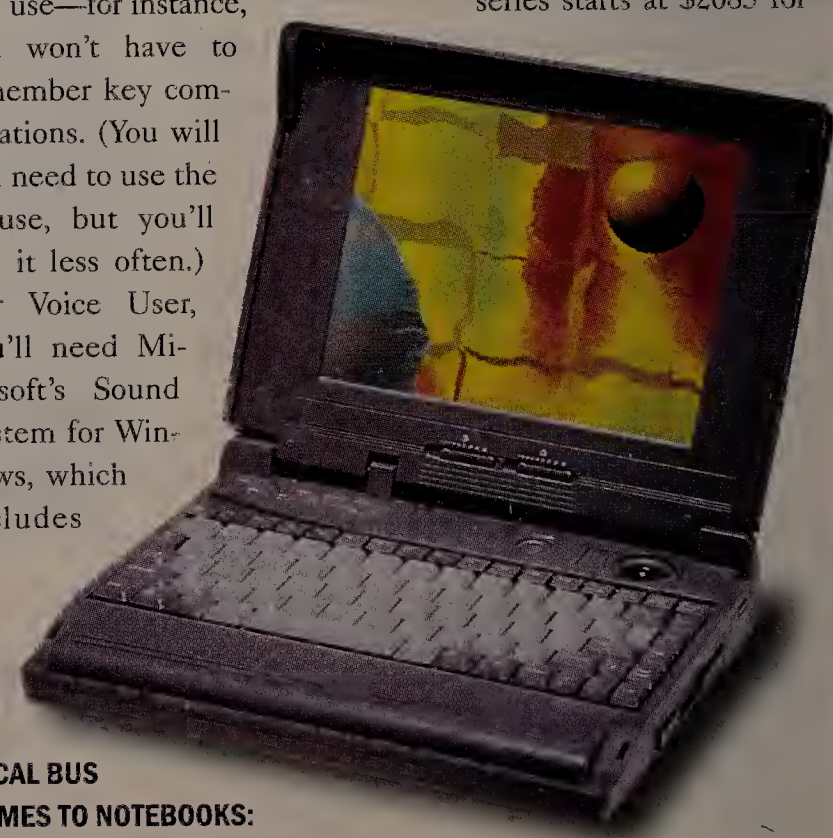
Voice User for Windows

Here's a way to literally talk to your PC using a software utility that lets you speak many Windows commands, such as "change icon," or "copy file, drive A:." Voice User aims to make Windows easier to learn and use—for instance, you won't have to remember key combinations. (You will still need to use the mouse, but you'll use it less often.) For Voice User, you'll need Microsoft's Sound System for Windows, which includes a sound card, a headset, and a microphone. Users who have disabilities may find Voice User particularly helpful. You will need a 486DX PC with 8MB of RAM and 5.4MB of available hard drive space. Voice User costs $79. Cylogic Software, 206/283-8800.

Reader service no. 691

Universa Notebooks

The local bus is extending its route into notebook designs, and some of the first are found in Aspen Computers' latest line of four 486 color and monochrome notebooks. The Universa notes are the first we've heard of to offer 33-MHz local bus speed for both the video and hard disk subsystems. This feature means snappier video and faster hard disk access than with most notebooks. All models are cooled by a minifan mounted near the CPU. Each comes with a built-in trackball and a 16mm PCMCIA slot, which accommodates a single PCMCIA Type III card, such as a hard drive, or two PCMCIA Type II cards. The Universa series starts at $2085 for



LOCAL BUS COMES TO NOTEBOOKS: Aspen Computers' Universa.

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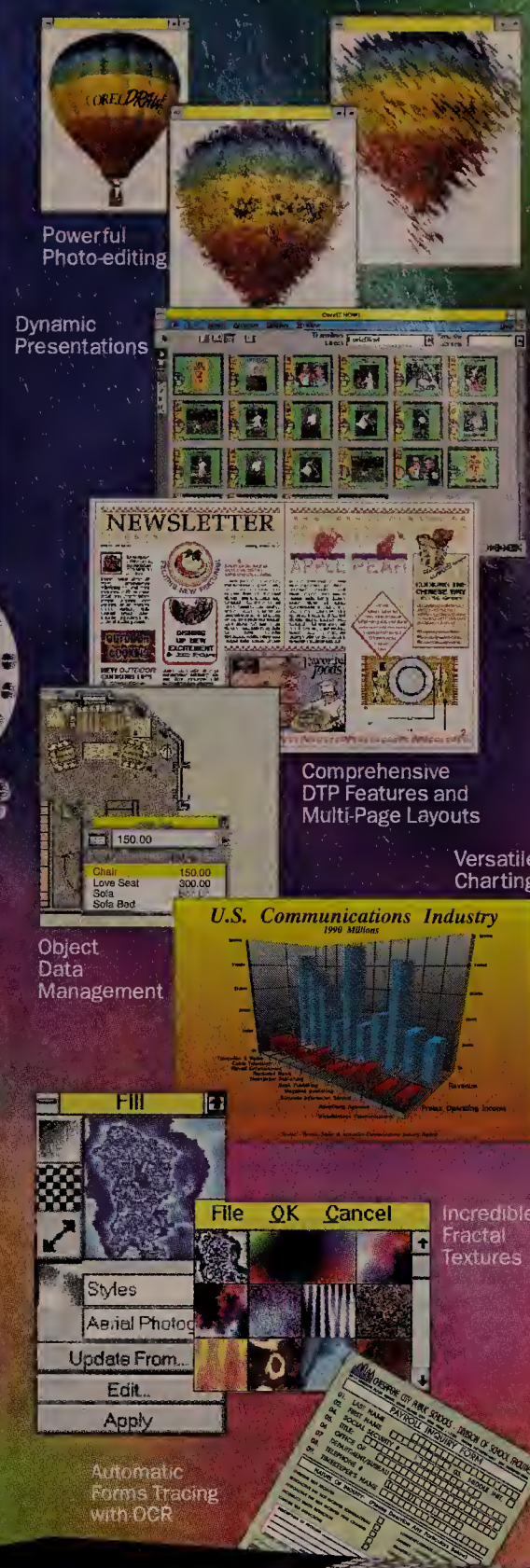

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— Computer Monthly Magazine Oct. '93

"Stereo PC is an idea whose time has come. Stereo PC oozes quality."
— Reseller World Magazine Oct. '93

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the 33-MHz 486DX with a monochrome screen, 4MB of RAM, and a 120MB hard drive, and tops out at $4645 for the active-matrix color model with a DX2 66-MHz CPU, 8MB of RAM, and a 340MB hard drive. Aspen Computers, 800/472-3273, 716/626-0315.

Reader service no. 697

PictureTel Live PCS 100

PictureTel has introduced a PC-based product that lets multiple users participate in a video conference. With the PictureTel Live PCS 100, each PC can display a video image (roughly one-third of the screen) using available telecommunications services. The product consists of two ISA add-in boards for video and audio, a speaker phone, a BRI ISDN interface for communicating over high-speed digital phone lines, and an adjustable camera. The PCS 100 costs about $1000 less than a similar product from AT&T and delivers higher-quality video, PictureTel claims. Also, the PCS 100 allows multiple sites to participate in a video conference while the AT&T product can connect only two locations. On the downside, the PCS 100 offers less robust application and file sharing. The PCS 100 costs $5995 per PC. PictureTel Corp., 508/762-5000.

Reader service no. 693

Image Alchemy PS

If you're frustrated by incompatible image file formats, check out Image Alchemy PS, a new utility that many desktop publishers may find helpful. Image Alchemy translates PostScript files into your choice of 60 image file formats, including TIFF, GIF, TARGA, and Windows Bitmap (BMP). It can convert a PostScript file to an image format and output the file to a non-PostScript printer or plotter. Image Alchemy also resizes and enhances images and offers JPEG file compression. The software comes with 35 PostScript fonts from Bitstream and can use any PostScript Type 1 font, the company says. Image Alchemy PS requires a 386 PC with 4MB of RAM and DOS 3.3 or a later version. It costs $349. Handmade Software, 800/358-3588, 408/358-1292.

Reader service no. 690

PaperBridge for Access

PaperBridge adds document imaging capabilities to Microsoft Access. This add-on utility allows you to append scanned images to any record. Once you've scanned in an image, you use Access to view it. You can also perform a wide range of functions on the scanned image. By clicking buttons on PaperBridge's floating palette, you can add text and Post-it notes, and highlight or black out sections of your image. PaperBridge automatically compresses files to an average 20-to-1 ratio to save disk space and directly supports a wide range of scanners, although it isn't TWAIN compliant. PaperBridge for Access has a list price of $145 through the end of December and lists for $245 thereafter. TeamWorks, 800/532-3198, 508/460-0053.

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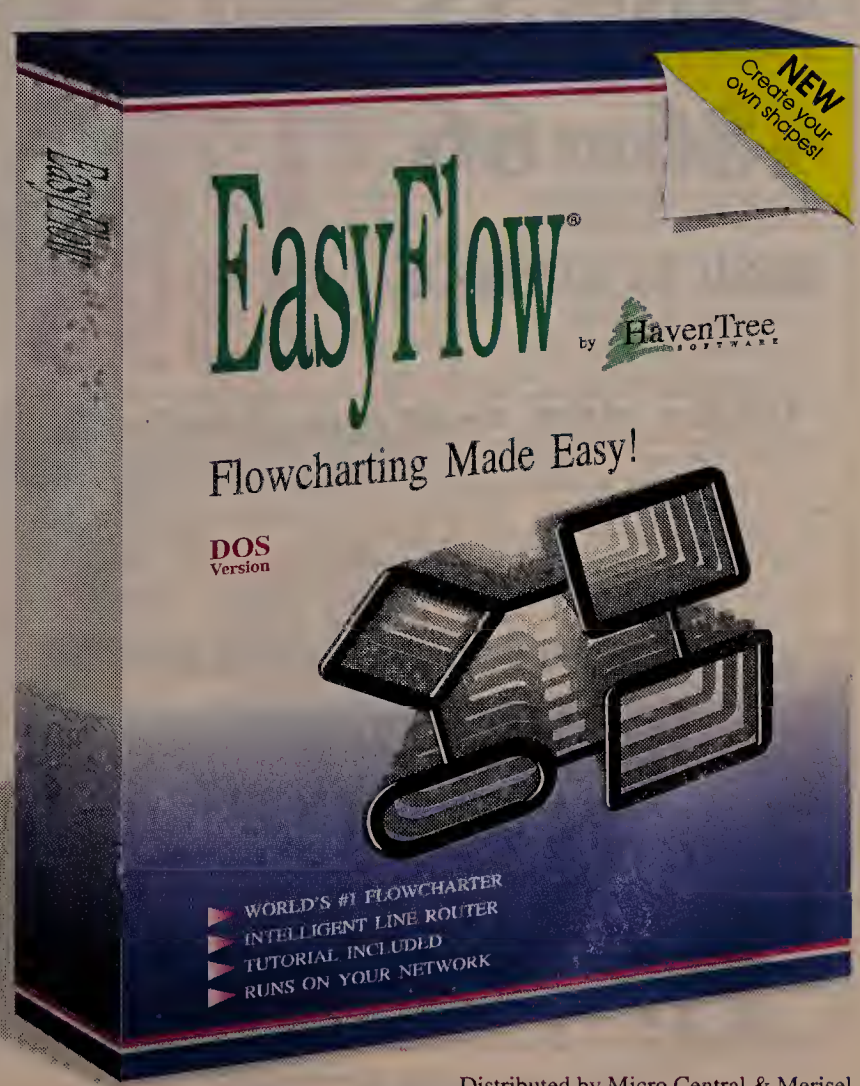

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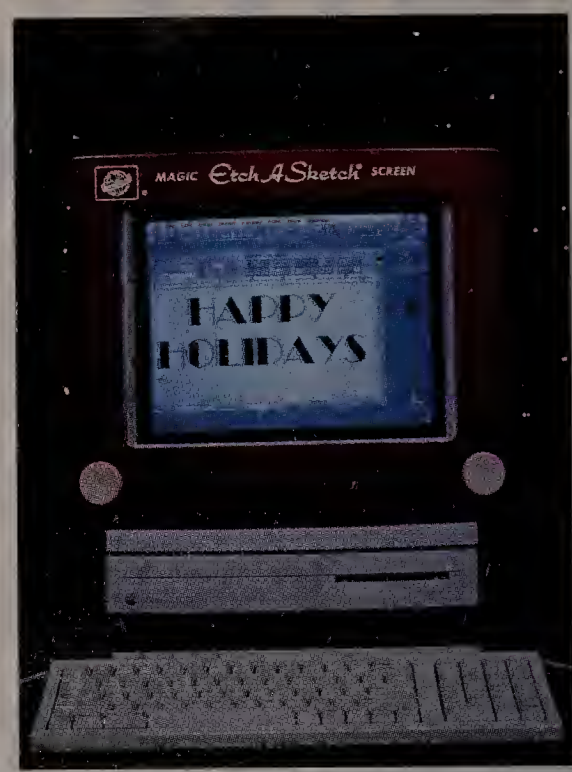
removes the complex analysis tools that make high-end mapping programs hard to understand. Though Sure-Maps cannot shade parts of a map to reflect high densities of contacts or complex analysis, it will display a point on the map for every contact in your database—a common use for mapping software. Sure-Maps displays information on extremely detailed raster maps or on faster but less detailed street-level maps. One shortcoming is that it imports only DBF and ASCII files. The product includes a continental U.S. map and two world maps. Additional city maps are available. Sure-Maps 2.0 lists for $199. Horizons Technology, 619/277-7100.

Reader service no. 696



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Screenies

Tired of looking at your monitor's boring beige bezel? The days of the dull display may be numbered now that Screenies are here. Screenies are decorative cardboard cutouts that affix to the front of your monitor, covering the plastic border without obscuring the screen. Our favorites include one that makes your monitor look like the world's biggest Etch-a-Sketch and another that makes it look like a fifties television set. Many other motifs are available. The velcro-backed frames fit both 14-inch and 15-inch monitors, and they have a list price of $11.95. Screenies, 800/959-6190.

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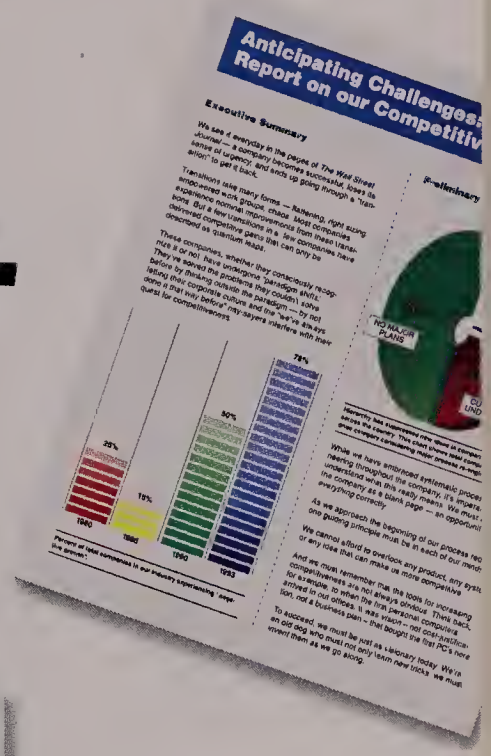
For more information about any product, contact the manufacturer or circle the number on the reader service card.

Start a paradigm shift.



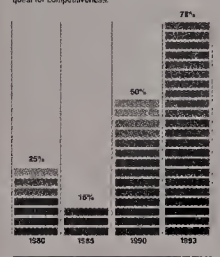
Anticipating Challenges: Report on our Competitiveness

Executive Summary

We see it everyday in the pages of *The Wall Street Journal* — a company becomes successful, loses its sense of urgency, and ends up going through a "transition" to get it back.

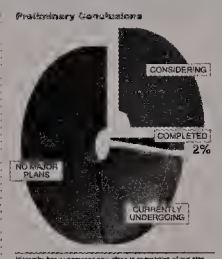
Transitions take many forms — flattening, right sizing, empowered work groups, chaos. Most companies experience nominal improvements from these transitions. But a few transitions in a few companies have delivered competitive gains that can only be described as quantum leaps.

These companies, whether they consciously recognize it or not, have undergone "paradigm shifts." They've solved the problems they couldn't solve before by thinking outside the paradigm — by not letting their corporate culture and the "we've always done it that way before" nay-sayers interfere with their quest for competitiveness.



Percent of total companies in our industry experiencing "negative growth".

Preliminary Conclusions



Hierarchy has suppressed new ideas in companies of our size across the country. This chart shows total companies in our revenue category considering major process re-engineering.

While we have embraced systematic process re-engineering throughout the company, it's imperative that we understand what this really means. We must think of the company as a blank page — an opportunity to do *everything* correctly.

As we approach the beginning of our process redesign, one guiding principle must be in each of our minds.

We cannot afford to overlook any product, any system, or any idea that can make us more competitive.

And we must remember that the tools for increasing competitiveness are not always obvious. Think back for example, to when the first personal computers arrived in our offices. It was vision – not cost-justification, not a business plan – that bought the first PC's here.

To succeed, we must be just as visionary today. We're an old dog who must not only learn new tricks, we must *invent* them as we go along.

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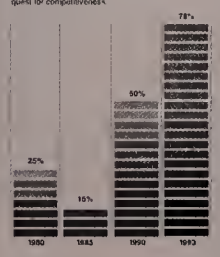
Transitions take many forms — flattening, right sizing, empowered work groups, chaos. Most companies experience nominal improvements from these transitions. But a few transitions in a few companies have delivered competitive gains that can only be described as quantum leaps.

These companies, whether they consciously recognize it or not, have undergone "paradigm shifts." They've solved the problems they couldn't solve before by thinking outside the paradigm — by not letting their corporate culture and the "we've always done it that way before" nay-sayers interfere with their quest for competitiveness.



Percent of total companies in our industry experiencing "negative growth".

Preliminary Conclusions

Hierarchy has suppressed new ideas in companies of our size across the country. This chart shows total companies in our revenue category considering major process re-engineering.

While we have embraced systematic process re-engineering throughout the company, it's imperative that we understand what this really means. We must think of the company as a blank page — an opportunity to do *everything* correctly.

As we approach the beginning of our process redesign, one guiding principle must be in each of our minds.

We cannot afford to overlook any product, any system, or any idea that can make us more competitive.

And we must remember that the tools for increasing competitiveness are not always obvious. Think back for example, to when the first personal computers arrived in our offices. It was vision – not cost-justification, not a business plan – that bought the first PC's here.

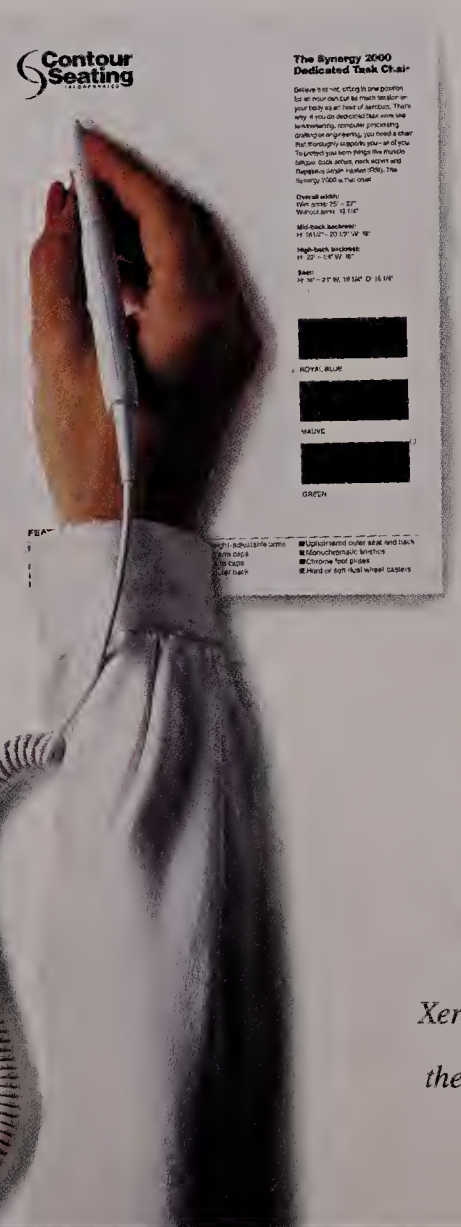
To succeed, we must be just as visionary today. We're an old dog who must not only learn new tricks, we must *invent* them as we go along.

Anticipating Challenges: Report on our Competitiveness

Xerox Introduces

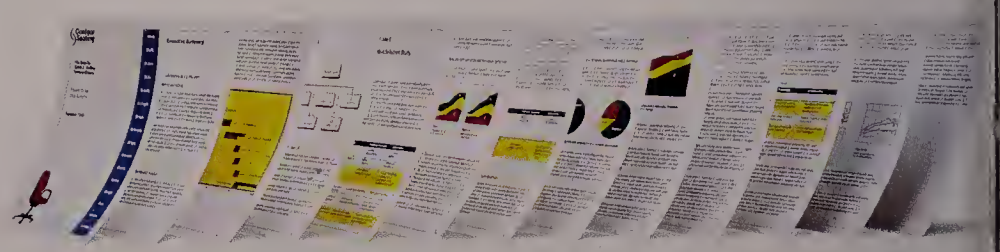
A whole new way to work

Customer Marketing Proposal *External Product Release* *Internal Market Share Report* *Customer Payment Notice* *Internal Inventory Report*



Color was never this easy before.

"Unparalleled ease of use[1]" is how experts describe intelligent color from Xerox. Our color copier adds color to any b&w document with a highlight pen in a matter of seconds. Our color printers deliver color as easily as b&w.



Color was never this fast before.

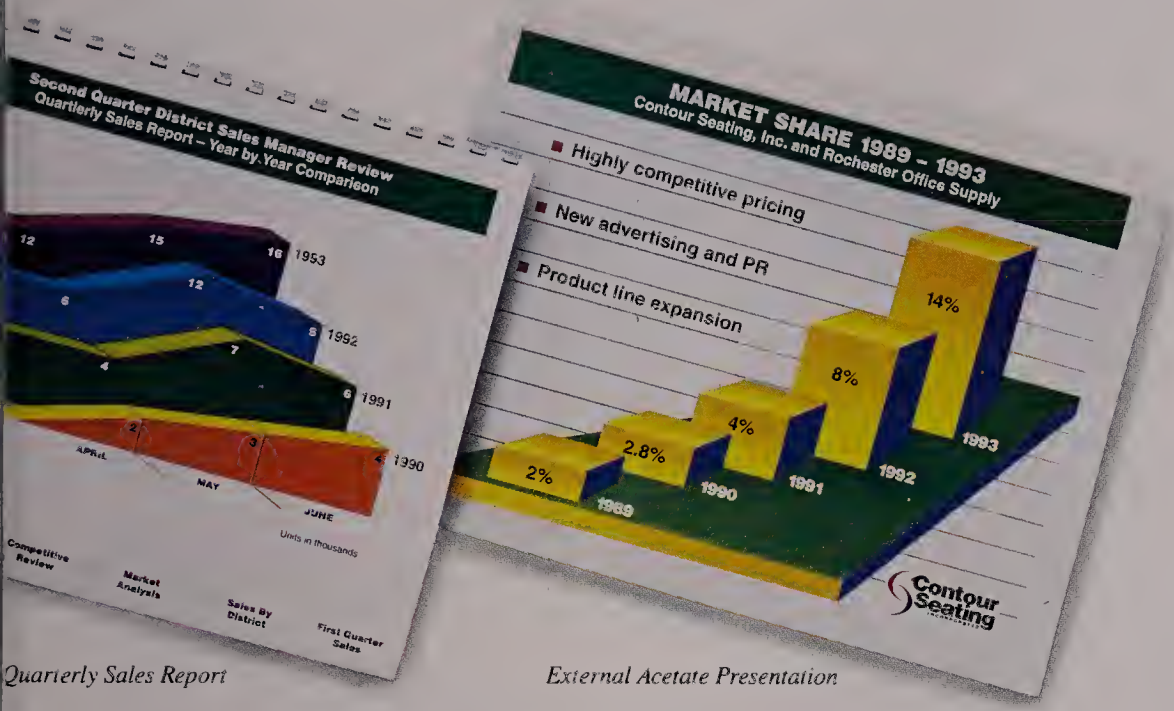
Xerox offers some of the highest "get the whole job done" speeds in color printing, because Xerox prints b&w pages at high-speed, switches to the color speed, then finishes by collating your job automatically. All at the lowest price per page.

**4/C pages produced on Xerox 4700 Color Document Printer; Tabbed divider pages on Xerox DocuTech Production Publisher; finished with GBC plastic comb binding.*
[1]Reference Buyer's Lab evaluation of Xerox 5775.

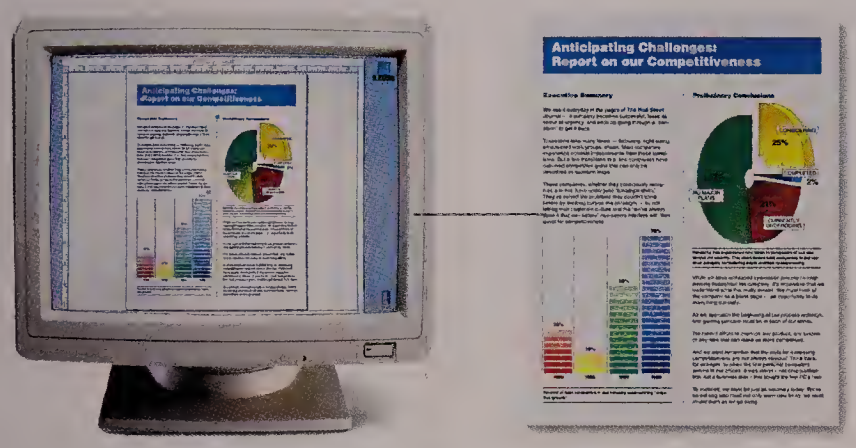
XEROX

ntelligent Color.

whole new way to compete.



Quarterly Sales Report *External Acetate Presentation*



Color was never this compatible before.

With intelligent color from Xerox, everyone in your company can communicate more clearly. Users can print from virtually all mainframes, networks or PCs—from high-end graphics to simpler business applications. You can even print personalized, variable data in a highlight color.

Color was never this competitive before.

% of our customers say mmunicating with color es us a strategic edge."
enner, Chief Information Officer
Hewitt Associates

"Adding color to our organization gave us added control over time, price and quality."
—Edward M. Gilbert, President
In & Out Printing, Inc.

"You have to have leading edge technology to compete successfully these days."
—Joel Cartun, President
Comvestrix Corporation

The rules of competition are anything but black and white anymore. Working the same ways, just harder and faster, doesn't work like it used to.

Today, the pressure is on to find new ways of working that give you more powerful ways of competing.

That's what intelligent color from Xerox is all about. It's much more than just leading edge technology. It's a whole new way to work that adds power to every black and white document you produce.

It's a whole new way to compete because your competition will pale by comparison.

Intelligent color means that you can now put the communication power of color into *more* documents—*faster* than ever before. And only intelligent color fits so smoothly into your work...so smoothly into your present technology.

It makes your presentation documents speak louder than words. And the facts and figures in reports jump off the page.

So if you're taking a few steps to become more competitive, we suggest you take a quantum leap instead.

Choose intelligent color. Only from Xerox.

To find out how you can become more competitive with intelligent color from Xerox, turn the page.

XEROX

Become More Competitive. Call The Xerox ColorConnection.

Call 1-800-TO COLOR

The Xerox ColorConnection

Now there's an expert resource for almost *everything* you need to be more competitive with intelligent color. In fact, one call gives you access to an extraordinary range of information, training materials, and *FREE* offers.

Call now to be more competitive

The Xerox ColorConnection is a unique interactive exchange system that lets you "browse" through our current information and offers—at your own pace, without sales pressure. It's that easy to start your own paradigm shift—so why not call *today* 1-800-TO COLOR (1-800-862-6567)!

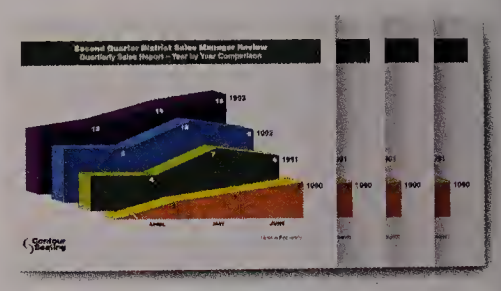
Ext. Code: PCSB

Win FREE use of a Xerox color copier or printer

Call now and you're automatically entered into the Xerox ColorConnection Sweepstakes. The grand prize is FREE use of the award-winning Xerox 5775 or the Xerox 4700 (your choice) for 12 months. Plus, every month we'll be drawing 6 additional names to win FREE use for 3 months. So pick up the phone now—because you have as good a chance of winning as anyone! (No purchase necessary to participate. Prizes include installation, service, and an initial supply package.)*

FREE information

To help you become more competitive, we've put together an extraordinary collection of materials. Like "Adventures in Color," a FREE interactive disk that shows how you can save time and money with the Xerox 4700 color printer. And "Color in the Black and White World of Business Documents," filled with fascinating info on the power of color. Plus much more—so call now.

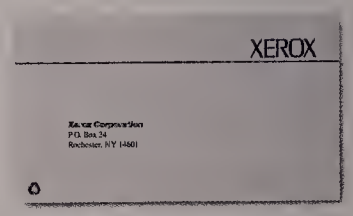


FREE color

Call now for details of how you can get FREE color copies or color print-outs.

FREE video

Hear a preview of several success stories—then order a FREE case study video or report about real people from real companies with real results.



FREE demonstration

See Xerox technology in action and talk to the experts at the next Trade Show or Xerox Color Symposium.

XEROX TOTAL SATISFACTION GUARANTEE

The Xerox Total Satisfaction Guarantee

Only Xerox offers TSG, the guarantee that lets you decide when you're satisfied. You'll also be supported by a network of Xerox Sales Representatives, Analysts and Engineers—the industry's best-trained, best-equipped team.

Xerox
The Document Company

*NO PURCHASE NECESSARY. To enter, call 1-800-TO-COLOR or on a 3" x 5" plain piece of paper, hand print your name, title, company name, company address, city, state and zip code. Each entry must be mailed separately to: Xerox "ColorConnection" Sweepstakes, P.O. Box 651, Gibbstown, NJ 08027. Maximum 10 entries per company (whether by phone or mail). Sweepstakes begins 9/1/93. All entries must be received by 12/31/93. Prizes will be awarded to the company named on the winning entry rather than to the individual who submitted the entry. Prizes and estimated retail values: (1) Grand Prize: Use of either (your choice) a Xerox 5775 color copier or Xerox 4700 color printer for a period of 12 consecutive months (est. value $18,000). (24) First Prizes: Use of either (your choice) a Xerox 5775 copier or Xerox 4700 printer for a period of three months (est. value $6,000 ea.). Prizes include installation (except for excessive rigging), service, and an initial supply package, additional supplies are the responsibility of the winning company. Total retail value is est. at $162,000. Sweepstakes is open to residents of the U.S., aged 21 or older who are employed by a company of 10 people or more. Odds of winning are determined by the total number of entries received. For a complete set of official rules, send a SASE before 12/31/93 to: Xerox "ColorConnection" Official Rules, P.O. Box 651, Gibbstown, NJ 08027. WA residents omit return postage. This sweepstakes is sponsored by Xerox Corporation, Xerox Square—05B, 100 Clinton Avenue South, Rochester, NY 14644. Void in Puerto Rico and where prohibited. For a list of prize winners, send a SASE before 1/31/94 to: "ColorConnection" Sweepstakes Winners, P.O. Box 776, Gibbstown, NJ 08027. • The product and/or company names used herein are trademarks of their respective owners. Xerox® The Document Company® and the identifying product number names herein are trademarks of XEROX CORPORATION. Printed in USA. © 1993, Xerox Corp.

"ECCO Professional is a Personal Information Manager, but that's like calling Michael Jordan a basketball player... You'll find yourself living in it."
—Paul Andrews, Computer Columnist and Co-Author of "Gates," 5/93

"Terrific! Easiest to use. Startling power. This is a program to get excited about."
—Jonathan Blackwood, Windows User, 7/93

"I'm actually putting my life into ECCO. That's how compelling it is... An incredible interface that absolutely positively urges you to tie information together in just the ways you need to view it."
—Kevin Strehlo, Executive Editor, InfoWorld, 5/93

"Best Buy." "For scheduling... for phone book data... for truly powerful personal data management, there's nothing better... The ultimate in linking information."
*—Daniel Tynan, PC World, 8/93**

"ECCO is the most important and unique advance in the category."
—Tim Bajarin, Noted Analyst, Creative Strategies, 5/93

"ECCO Professional represents a new frontier in Windows-based personal information managers."
—Brad Grimes, PC Magazine, 6/93

"The Outlook gives ECCO Professional our Best Buy recommendation."
—Andrew Seybold, Outlook on Mobile Computing, 5/93

We're not the only ones calling it a SuperPIM.™

ECCO.™ Because an organized life is an easier life. Sure, computers have made certain things easier—writing letters, creating charts, that sort of thing. But what about the rest of your day? Making calls, preparing for meetings, appointments, coordinating projects, and gathering random thoughts—then finding them again?

That's what ECCO, the world's first SuperPIM™ (personal information manager) for Windows is all about.

ECCO Professional goes beyond traditional PIM and contact manager functionality, giving you a tightly integrated calendar, phonebook, to-do's and outliner. Plus, it lets you quickly organize and cross-reference all your information. So you see it where you need it, when you need it.

ECCO PROFESSIONAL
*The original SuperPIM. SRP $395.***
ECCO SIMPLICITY
SuperPIM SuperEasy SuperPrice. 90-day intro. offer $79.
Call 1-800-457-4243 ext 24.

Now there's also new ECCO Simplicity. It's the SuperEasy way to start using the power of a SuperPIM. You get our core calendar, phonebook, to-do's and outliner. And at $79 (intro. offer), you get a SuperPrice. So try it.

ECCO won't just change the PIM category—it'll change your life.

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Circle 27 on reader service card

The BJC-600 Color Printer In Black And White.

At Canon®, we think that before you go out and buy a personal color printer for your home or small office, you should have all the facts in black and white. And have them right in front of you.

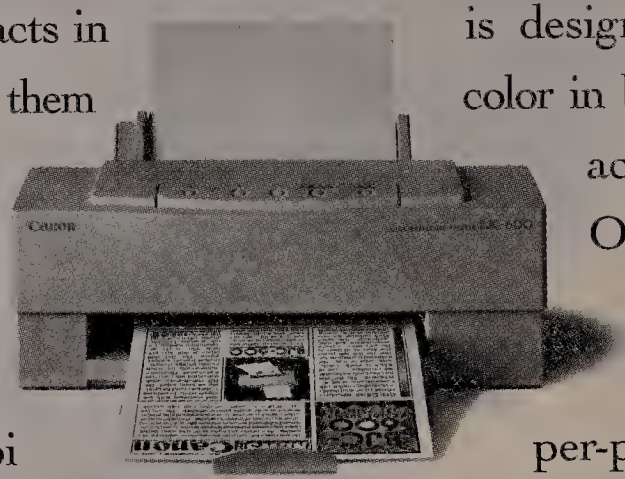
So, let's start with the quality of our print.

The new Canon BJC-600 prints 360 dpi for both brilliant color and crisp black and white output on plain paper. Other color printers print a mere 300 dpi.

We also use inks that are richer and more vibrant. And to eliminate cross-color bleeding on plain paper, our inks have been made to dry much faster than conventional inks.

Now, what's the graphics print-out speed like?

Faster than you'd expect from a personal color printer. That's because the new BJC-600 print head has 192 color nozzles, compared to as few as 48 on other personal color printers. And to further help speed it along, the BJC-600 is designed to print color in both directions across the entire page.



Okay, how about all the little hidden costs?

Not here. The cost-per-page of the BJC-600 is a fraction of what you would normally pay for color printing.

Unlike most other color printers, the BJC-600 has 4 separate ink cartridges — one for each color. So when you run out of one color you don't have to replace all the others.

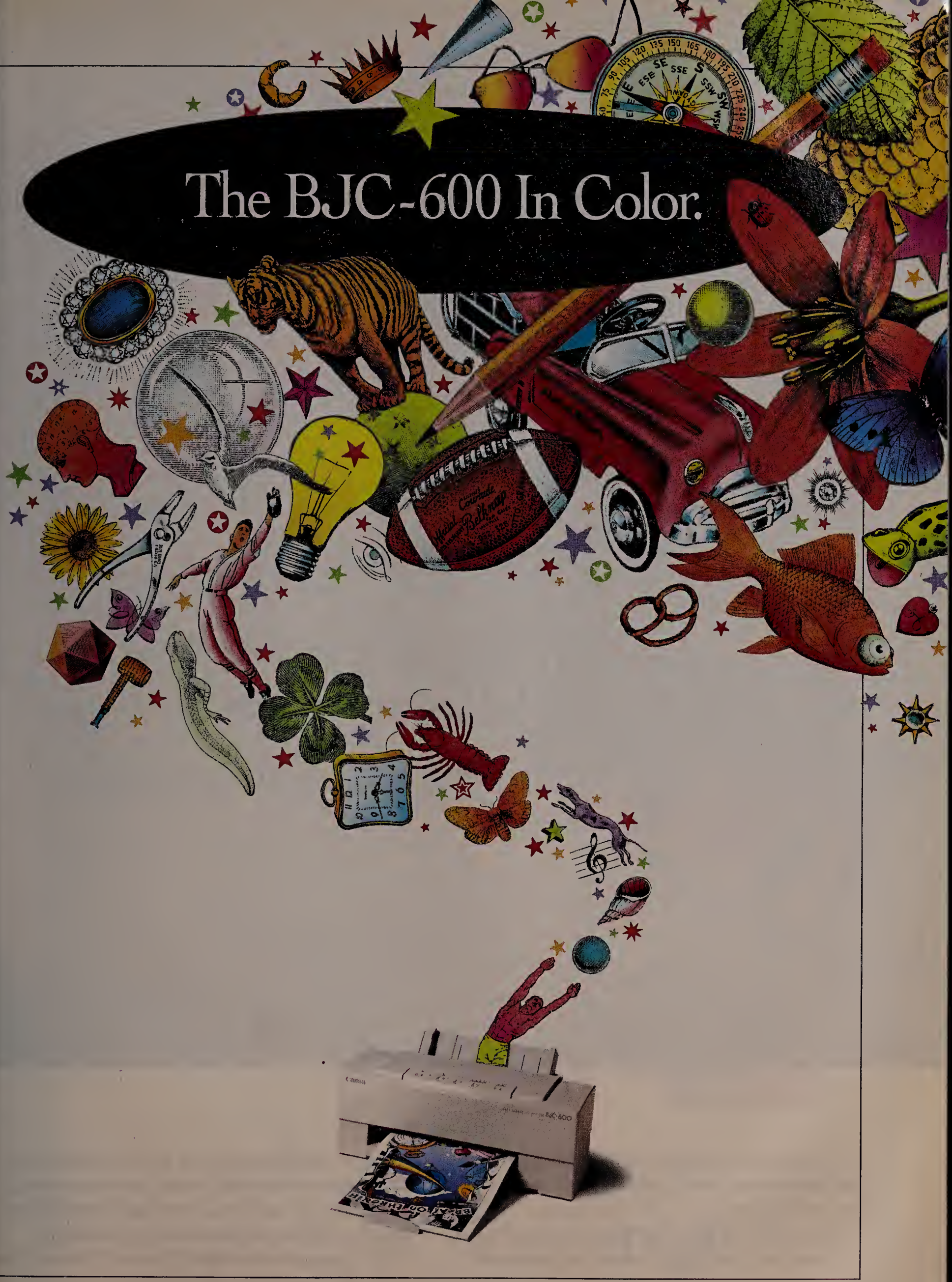
Finally, at less than $649*, the Canon BJC-600 color printer will save you money right from the start.

To get the name of your nearest Canon dealer, call 1-800-848-4123. Because now that you know the facts in black and white, it's time to see the BJC-600 in color.

Canon

*Dealer prices may vary, but most dealers sell the BJC-600 at prices under $649. © Canon Computer Systems, Inc. Canon and BJ are registered trademarks, and Bubble Jet is a trademark of Canon Inc. CCSI 2995 Redhill Ave., Costa Mesa, CA 92626. In Canada, call (800)387-

The BJC-600 In Color.



Vroooom! When you're on the road, there's no time to slow down for faxmodem hassles. And with Intel PCMCIA cards, you'll go from zero to faxing in no time.

Just insert the PCMCIA card into any Type II or Type III slot. Unlike other cards, Intel faxmodem cards require no powering down, no reconfiguring, and no com ports to set.

Applications won't bring you to a screeching halt either. The card launches and configures fax and communications software so you can fax without annoying extra steps.

Of course the card is made for the road. With a built-in

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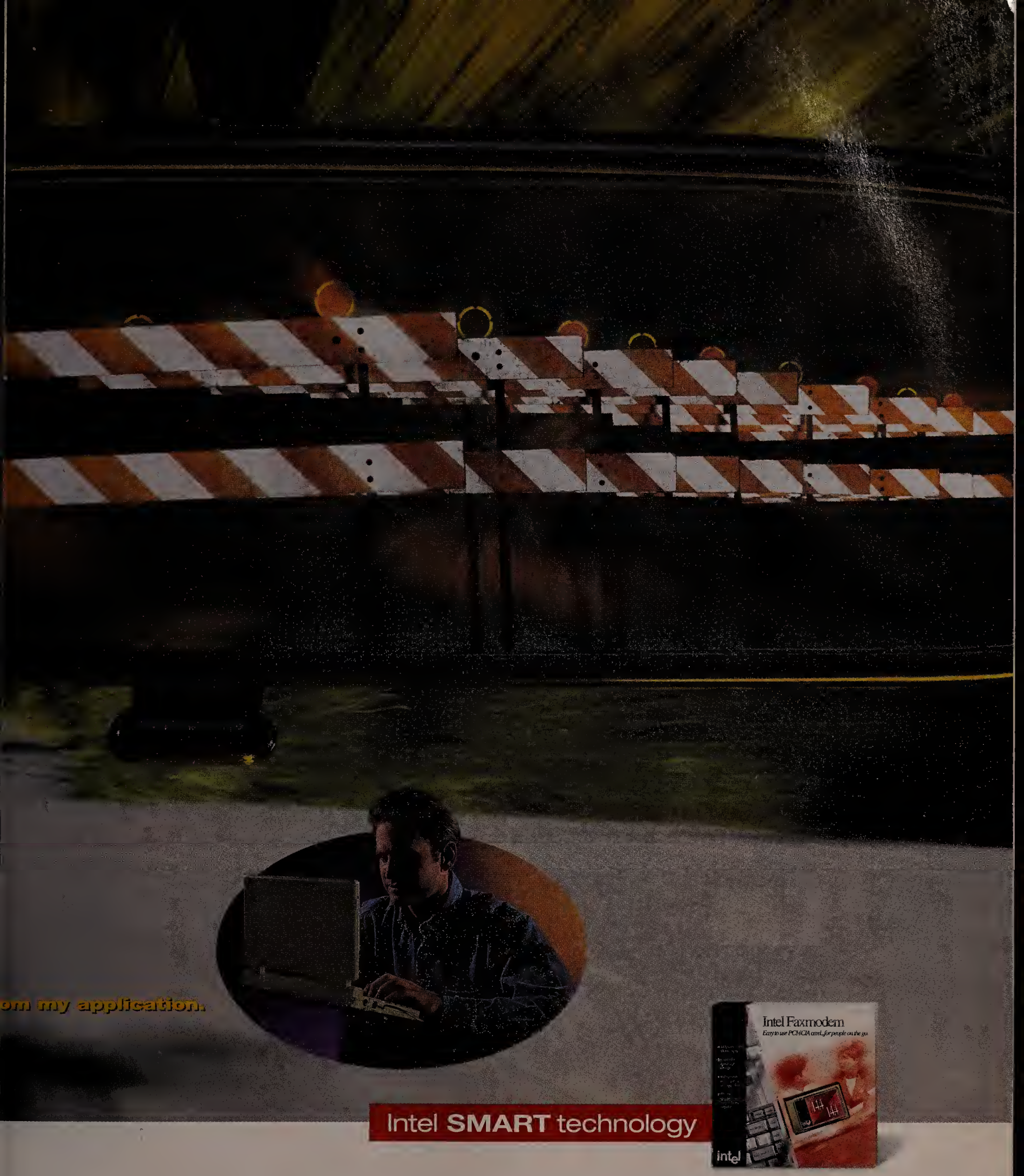


phone line adapter. Sleep features to preserve battery power. On-line manuals. And three data/fax speeds on the industry's most durable PCMCIA card.

So leave your faxmodem obstacles in the dust. Just call 1-800-538-3373, ext. 1015 or dial Intel's automated FaxBack* service at 1-800-525-3019 and ask for document #9713. Then go see your reseller. And get ready to really hit the gas.

intel®

Circle 109 on reader service card

TOP 200

Which brand of PC captured first, second, and third places for best systems of the year? Which dark horse in the spreadsheet race is the most promising newcomer? PC World's annual World Class Awards reveal who's in, who's out, and why and take a look ahead at up-and-comers that may well be the winners of tomorrow.

PRODUCTS

BY BRONWYN FRYER

MARK JASIN

You've placed your bets. You've cheered for your favorites. And now the contestants in *PC World*'s annual World Class Awards have crossed the finish line. This year it's a photo finish in several key categories, with some surprising results in both hardware and software.

Ballots hit the streets with our June issue, and we received a whopping 18,584 responses by fax and mail over the next six weeks. You reported your choices in 50 categories of hardware and software—more categories than in any other year over the 11-year history of these awards.

In the pages that follow, you'll find the complete list of winning products, meet the people who won our prize drawing (see "And the Winners Are..."), and find out why *PC World* readers chose the products they did. You'll also get an inside look at some hot new products that may well be the World Class winners of tomorrow.

And the Winners Are...

When you cast your ballot in *PC World*'s annual World Class Awards, you're also throwing your name into the hat to win big prizes. Every year, we randomly select three winners from the thousands of ballots we receive. Say hello to the three lucky 1993 winners, each of whom took home a small fortune in hardware and software.

First-Prize Winner

Mark Dintzner

"Since I didn't have a scanner, I could only dream of working with computer graphics before."

- **First prize: A Gateway 2000 4DX2-66V, plus the winning laser printer, sound board, CD ROM drive, fax-modem board, scanner and pointing device, and 15 winning software packages**
- **Estimated value: $28,000**
- **Home: Feeding Hills, Massachusetts**
- **Profession: Supervisor of computer system maintenance for Pratt and Whitney in East Hartford, Connecticut**
- **Hobby: Fixing up a second property**
- **Office PC: IBM PS/2 Model 55**
- **Home PC: IBM PS/2 Model 55**
- **Core programs used: Microsoft Word for Windows and Access**

Chalk One Up for the New Guy

The real winner with voters this year was innovation. Some products were so new we expected them to get votes from only our most adventurous readers, particularly since computer users have a reputation for sticking with their installed software. But with the trend toward ease of use, people seem to be abandoning tradition in favor of innovations that make their lives easier. New Windows packages are winning out over longtime favorites. In the hardware arena, portable computers that make your life easier, and faster computer systems that require little time to get up and running have taken a runaway lead among the voters.

Hardware Favorites: Gateway by a Furlong

In 1993, hardware with Intel's 486DX2 processor firmly established itself as the first choice among *PC World* readers. But you don't want just a powerful CPU—you want all the bells and whistles that go with it: sound boards such as the SoundBlaster Pro, fax-modem boards such as Intel's SatisFaxtion, and graphics boards such as the ATI Graphics Ultra Pro—all winners in their respective categories.

For the second year running, Gateway topped the list of PC makers, winning first, second, *and* fourth place in the desktop system category. And though powerhouses like IBM and Compaq have dropped their prices and beefed up service considerably over the last year, it was another mail-order firm—Zeos—that won the remaining top spots in the desktop system category.

The winning Gateway 2000 4DX2-66V comes standard with 8MB of RAM, a 340MB hard disk, DOS, Windows, and one preloaded software application, and costs $2995. Its features and low price also won it a *PC World* Best Buy in our March 1993 review of desktop computers.

Gateway's no slouch in the portables categories, either. Its Nomad 450DXL notebook tied with the IBM ThinkPad 700C in the laptop/notebook category, and its HandBook won among subnotes. Gateway also captured the Best Service and Support category for the second year in a row, despite rough times in the fall and winter.

"Gateway has discovered an amazing secret," says Jesse Berst, editor of *Windows Watcher*, a newsletter published in Redmond, Washington. "Give people more for less, and they are going to like you."

World Class Awards voter Vicki Thompson, an analyst with the Chevron Corporation in San Francisco, says she voted for the Gateway 4DX2-66V not only on the basis of price and reliability but also because of its plug-and-play configuration. "It came with all kinds of goodies I wanted already loaded on it. I took it out of the box and had everything running in short order. It's very fast, and for the price I doubt I could do better."

Notebooks and Printers: The Old and the New

Market watchers agree that for competitors to catch up to Gateway, they'll have to meet its challenge in three areas: leading-edge technology, innovative offerings, and low prices. One product that succeeds in all these categories comes from Big Blue, whose hardware products haven't made it into our top listings in more than five years. But the emergence of the IBM ThinkPad 700C—a multimedia, pen-convertible notebook—demonstrates that innovation is alive and well at IBM and that customers, given the right product, will come back in droves.

The ThinkPad puts IBM back in the running among technical innovators, says Amy Wohl, president of Wohl Associates, a market research and consulting firm in Bala Cynwyd, Pennsylvania. "When I first saw it, I couldn't believe it came from IBM," she notes. "It's got everything—it's small, has a good color screen, a unique pointing device that's actually usable, and is a good value for the money. IBM did a wonderful job with this product."

Most analysts believe that the advent of exciting new technologies like the ThinkPad and small, portable PCMCIA cards

Looking Ahead: The World Class Winners of Tomorrow

PC World readers returned their votes for favorites in a range of hardware and software categories. But technology is changing at a dizzying pace, and as computer journalists, we get to glimpse the future shortly before it happens. So we asked our experts where the greatest changes are occurring and what products represent the biggest breaks from tradition. Their answer? Ten hardware and software products that move into uncharted territories. Will one of these be a World Class winner of tomorrow? You be the judge.

The All-in-One PC

If we had to pick the year's biggest surprise in desktop PCs, Compaq's Presario series would be high on our list. For one thing, the Presarios are being sold to the small office and home office market through consumer electronics stores and mass merchants—a radical change for a company that until recently sold only through VARs and computer dealers. But most unusual is the way they're built. Presarios don't look like traditional PCs: Their monitor is integrated with the CPU, so they look like a Mac IIsi.

Presarios are designed to take the decisions and hassles out of the computer purchase so novices can open the box, turn on the computer, and start working. But they're powerful systems. The initial offering, the Presario 425, comes with a 486SX-25 CPU, 4MB of RAM, and your choice of a 100MB or 200MB hard drive (200MB is standard). The built-in monitor is capable of 1024 by 768 resolution, but defaults to 800 by 600 with 256 colors and a 72-Hz refresh rate. One extremely nice touch: a built-in 9600/2400 fax-modem that supports voice mail.

The Presarios exceed the federal government's Energy Star guidelines for power savings. They are also backed by a three-year warranty, which includes one year of free on-site service and technical support that's accessible 24 hours a day, seven days a week. *Presario 425 $1399; Compaq Computer Corp.; 800/345-1518.* Reader service no. 628

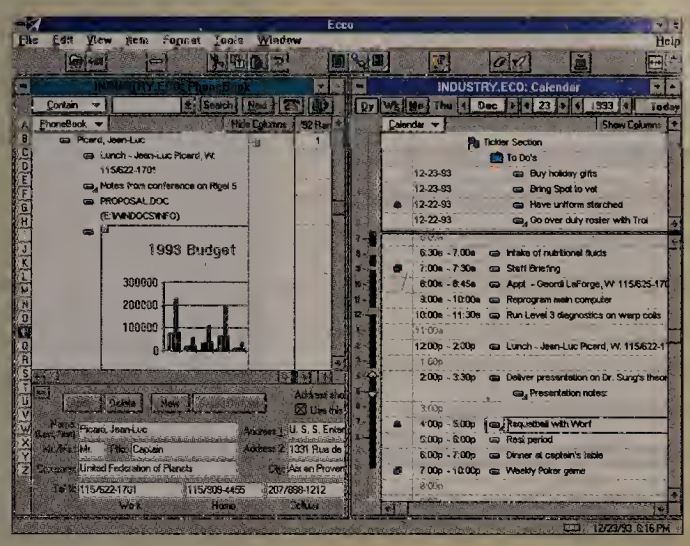
—Dan Miller

COMPAQ'S INNOVATIVE ALL-IN-ONE PRESARIO 425 brings a whole new look to the mass market.

Ecco: The Sound of PIMs to Come

Personal information managers are a great way to keep track of people and time, but—if Arabesque's Ecco is any indication of the future—they'll soon do far more. Arabesque's $395 "SuperPIM" stores your addresses and calendar in a series of collapsible outlines. You can attach a ton of data to each name or meeting, call it up when you need it, then tuck it away again with a few mouse clicks. Unlike other PIMs, Ecco lets you attach text, graphics, and even charts with live links to spreadsheet data for any record or meeting, then organize the data in electronic folders by person, project, work group, or whatever. Best of all, you don't have to be inside Ecco to take advantage of the unique Shooter utility. It lets you send data from any Windows application to an Ecco folder, or even from one application to another. Ecco is one of the few PIMs that lets you keep all your personal information in one place—an idea that bears repeating. *Ecco $395; Arabesque Software; 800/457-4243, 206/869-9600.* Reader service no. 633

—Daniel Tynan



ECCO'S ADDRESS BOOK AND CALENDAR hold everything from text and charts to graphics and sound.

Something Old, Something New, Something Green

Take a minuscule desktop footprint, add a handful of proven mobile computing technologies, and you've got a breakthrough system that sets the standard for environmentally friendly, ergonomically sound computing: IBM's PS/2 E.

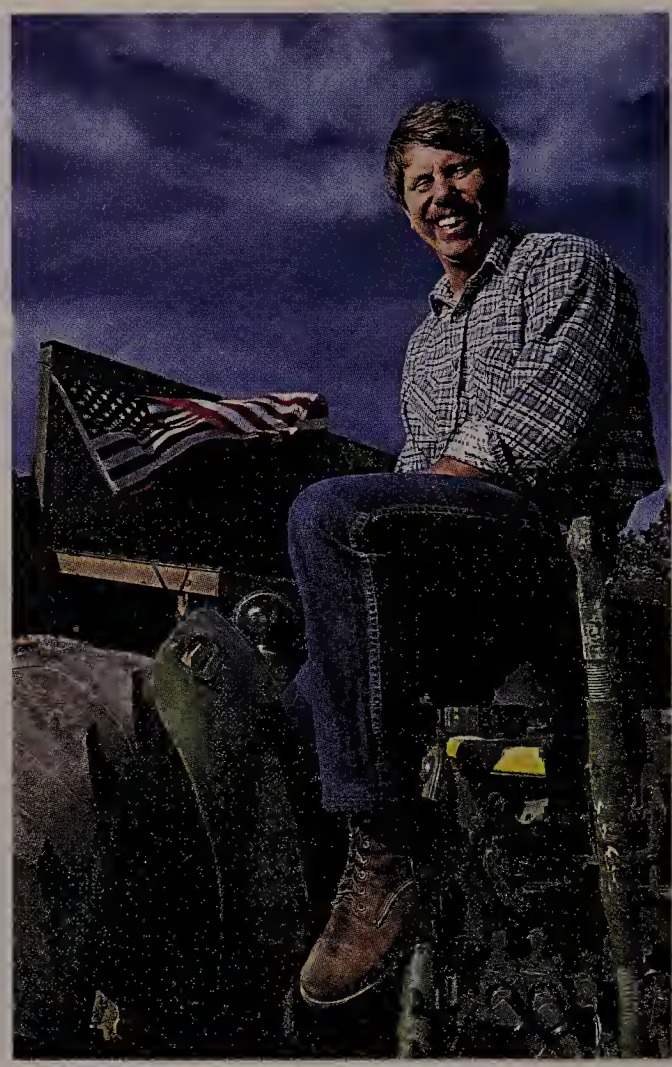
On the environmental side, this desktop system defines energy efficiency. During full operation, the PS/2 E draws only about half as much power as other low-power systems recently tested by the PC World Test Center. To accomplish this feat, the PS/2 E incorporates high-performance, low-power components such as a 3.3-volt, 50-MHz 486SLC2 CPU that draws about half the power used by standard 5-volt CPUs; a 2.5-inch 120MB notebook hard drive that draws half the power of its 3.5-inch counterparts; and four PCMCIA slots that, according to IBM, draw about a quarter of the power standard ISA devices use. The optional 10.4-inch LCD notebook screen offers VGA resolution and two low-power modes. The PS/2 E also offers another environmentally correct feature: Many of its parts are recyclable, and 25 percent of the

(continued on page 159)

Second-Prize Winner

Jerry Telker

- **Second prize: An IBM ThinkPad 700C notebook computer, plus the winning ink jet printer, removable/portable drive, fax-modem, and ten winning software packages**
- **Estimated value: $14,000**
- **Home: Hinckley, Minnesota**
- **Profession: Owner of a nursery/garden supply and landscaping business**
- **Hobby: Horseback riding, playing with the computer, photography**
- **Office PC: A 386SX from PC Express in Minneapolis**
- **Home PC: "The same computer—I've been lugging it back and forth."**
- **Core programs used: Lotus's 1-2-3 release 2.4 and WordPerfect 5.1**



"There's just so much that's possible now that wasn't possible before. I won't have to go to the machine anymore, the machine will be with me."

Third-Prize Winner

Jay Miller

- **Third prize: A Gateway 2000 HandBook, plus the winning dot matrix printer, a modem, an extra battery pack, a carrying case, and five winning software packages**
- **Estimated value: $8000**
- **Home: Bethesda, Maryland**
- **Profession: Research assistant at the National Institute of Health in Bethesda**
- **Hobby: Stamp collecting, astronomy, photography**
- **Office PC: Dell 386/33**
- **Home PC: Apple IIe and Mac Classic II**
- **Core programs used: Microsoft Excel, Word, and Works**

"As a serious amateur astronomer, I'll be able to operate a telescope remotely using my computer and modem to pick up objects in the sky."

will usher us into the next era of computing. Portia Isaacson, president of The Dream IT, a Colorado Springs market research and consulting company, predicts that most of us will soon be able to take care of all our computing needs without being tethered to a desk. "Our desktop systems will become 'base stations,'" says Isaacson. "Soon we will even see hard disks on PCMCIA cards, and we'll have absolutely everything we want on our notebooks."

Technical innovations define the game in printers too, but don't look for any surprise winners in this category. Hewlett-Packard swept the printer category once again. With the introduction of the LaserJet 4 line of printers, the company whose name is synonymous with laser printers set new standards for quality and price in 1993. And the competition is still scrambling to catch up. The 8-page-per-minute LaserJet 4 was the first laser printer to boast a 600-dot-per-inch resolution, which quickly became a new printing standard.

The LaserJet 4—this year's World Class winner—defined the low end of the market. The 4L gives buyers 300-dpi output, scalable fonts, and a cool new bidirectional port, all for about $700 on the street (a price so low, only Okidata had dared offer it before). The top showing of several printers in the LaserJet 4 series proves once again that when it comes to printers, Hewlett-Packard still leads and others follow.

Pentium: At the Starting Gate

In 1992, Logitech's FotoMan, a digital camera, was recognized as the Most Promising Newcomer among hardware products. But "More power!" seemed to be the chant of users this year. Intel's new Pentium chip captured first place, perhaps because there's no such thing as "fast enough," whether you're contemplating running 32-bit operating systems like Windows NT or just salivating over those rows of CD ROM titles at your local superstore.

With twice the power of a DX2-66, the Pentium is definitely the stuff that dreams are made of, but many readers seem to be hedging their bets. One reader volunteers, "The one thing that keeps me from getting Pentium is the heat—it's so hot you can cook an egg on it." Lisa Mentkow, a vice president at Bonay Building Corpora-

tion in Wellington, Florida, adds, "Until I really see the Pentium chip in action, it's just an abstraction."

Software: More Than Just a Pretty Face

"I was a heavy-duty DOS user," says voter John Andrews of Rancho Santa Margarita, California. "But once you switch to Windows, you can never go back."

From the look of things, that's the sentiment of most users these days as Windows applications became firmly ensconced as winners in most categories. The biggest surprises were in two key areas: communications software and databases. Paradox for DOS dropped to third place in the database category behind Microsoft Access and Paradox for Windows. And even in communications software, where the speed of DOS has slowed down the switch to Windows, Procomm Plus for Windows beat out Procomm Plus for DOS. WordPerfect was the only DOS program that held its own this year.

Another surprise winner in software turned out to be one of the oldest players in the industry: Lotus Development Corporation. Although Lotus still trails its nemesis Microsoft in many categories, Lotus managed to give its competitors a run for their money. Lotus Improv won as Most Promising Newcomer, 1-2-3 for Windows edged closer to Quattro Pro for Windows in the spreadsheet category, and Freelance Graphics for Windows displaced the long-standing winner Harvard Graphics in the presentation graphics category.

"Lotus has finally passed the phase of learning Windows and is starting to invent ways to take advantage of it," says analyst Berst. "And it has a year or two head start in the groupware area. That makes Lotus a very strong contender."

Word Processors: A Close Race

WordPerfect has won the word processing category since 1986—the longest string of victories for any product or company. It won this year too, but only by the

The World Class Winners of Tomorrow

(continued from page 157)

product is made of recycled materials.

Employing all those compact, low-power components provides several ergonomic bonuses as well. First, the system requires no fan for cooling, so it's virtually silent. The LCD monitor has almost no emissions, so there's no potentially hazardous electromagnetic radiation. And the 12-by-12-inch system unit takes up about as much desk space as an open magazine, so you'll have room to rest your head when you learn the price of the top-of-the-line PS/2 E with LCD monitor: a whopping $6780. *PS/2 E $6780; IBM; 800/772-2227.*

—Randy Ross

SAY GOOD-BYE TO THE HASSLE of printing on the road: Canon's NoteJet 486 is a PC and printer in one.

Is It a Notebook? Is It a Printer?

Computing on the go is easier than it used to be. But there's one nagging problem that not even the World Class–winning IBM ThinkPad or Gateway Nomad have addressed: getting hard copy while you're on the road. The solutions are either inconvenient (carrying a 3- or 4-pound portable printer along for the ride) or impractical (sending yourself a fax at your hotel, which works only when you're doing business there).

Canon's innovative NoteJet 486 combo changes all that. At first glance this might seem like a rather sizable notebook—7.7 pounds and 12.2 by 10 inches. But behind that bulk lies a laser-quality 360-dpi ink jet printer. There's a paper path for up to ten sheets of paper, and the unit prints about two pages per minute.

The Canon NoteJet is powered by TI's 486SLC/25; it includes a 180MB, a 135MB, or an 85MB hard disk and 4MB of RAM; and it offers 3 to 4 hours of battery life. The 9.5-inch backlit VGA screen offers 16 shades of gray. There are two PCMCIA slots. *NoteJet 486 $2999 (with 180MB hard disk); Canon Computer Systems; 800/848-4123.* Reader service no. 629

—Russell Glitman

It's Simply Money

Kiplinger's CA-Simply Money is up against some entrenched competition in the personal finance software arena, namely Intuit's Quicken. But Computer Associates is out to gain market share by virtually giving copies away through December—all you pay is $6.95 each for shipping and handling—and by including an interesting new concept: financial advice.

Kiplinger's Financial Advisor, included in the program, is based on information provided by editors of the *Kiplinger Letter*. The Advisor monitors your transactions and volunteers helpful messages. For example, the Advisor helps you decide how to achieve your investment goals.

Like other leading personal finance programs, Simply Money lets you track your spending by filling out a check on your screen and allocating it to the right expense account. However, this program also comes with impressive tools for managing a portfolio of investment securities. Create an investment account, and you can keep track of capital gains, interest and dividend income, and expenses such as margin interest.

Finally, the icons in this Windows program are stunning. You can select from over 200 that depict income and expense

(continued on page 164)

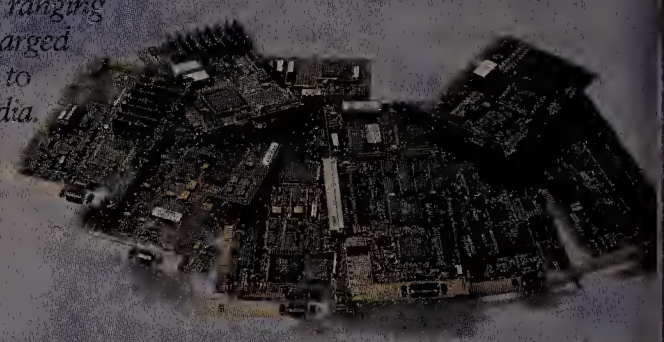
Superior In E

Every Nanao monitor undergoes intense scrutiny and testing to ensure maximum performance and product reliability. Our quality control processes and technical standards are among the most rigorous in the industry.

Our new line of Ecological Design™ Monitors incorporates advanced energy-saving features including PowerManager, which cuts power as much as 93% when the monitor is not in use. (After Dark screen saver software free with each monitor.)

Nanao was the first monitor company to join in partnership with the EPA Energy Star Program. Our commitment to bring technical innovation to today's environment ranges from eliminating CFCs in our manufacturing process to using recyclable packaging and paper products.

Nanao FLEXSCAN technology is compatible with all of today's popular graphics cards, offering a viewing environment ranging from enlarged graphics to multimedia.



MPR II

Nanao's FLEXSCAN family of monitors meets safety specifications for radiation emissions established by the Swedish MPR-II guidelines as well as those of TCO, the Swedish Confederation of Professional Employees. Nanao was the first monitor manufacturer to achieve FCC Class B approval for our 80kHz frequency monitors.

REDUCED ELECTROMAGNETIC FIELDS TCO 1992 AUTOMATIC DISPLAY POWER DOWN

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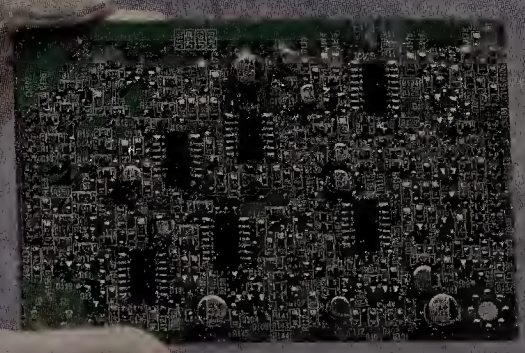


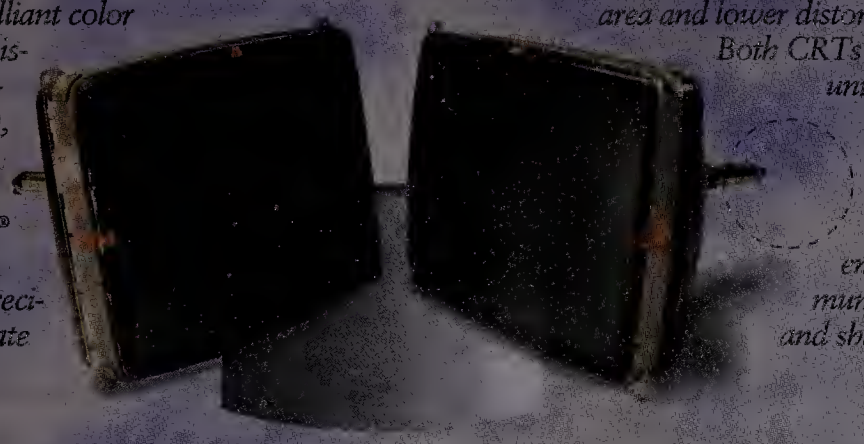
Model	Size	Dot Pitch	Scan Frequency	Recommended Resolution
T660i	20"	0.30mm	H:30-82kHz V:55-90Hz	1280x1024
T560i	17"	0.25mm	H:30-82kHz V:55-90Hz	1280x1024
F760i-W	21"	0.31mm	H:30-78kHz V:55-90Hz	1280x1024
F560i-W	17"	0.26mm	H:30-82kHz V:55-90Hz	1280x1024
F550i-W	17"	0.28mm	H:27-65kHz V:55-90Hz	1024x768
F340i-W	15"	0.28mm	H:27-61.5kHz V:55-90Hz	1024x768

Nanao T-Series and F-Series monitors have captured every major award.

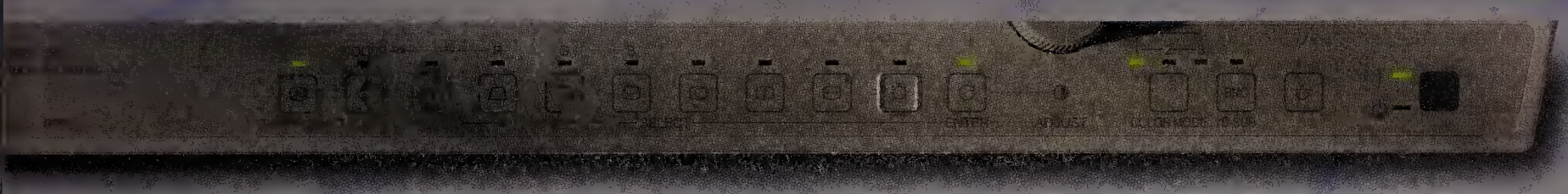
very Detail.

A heritage of precision craftsmanship and attention to detail has been designed into Nanao's family of display monitors.

Our high resolution CRTs deliver a complete range of color displays with photographic quality and brilliant color images to sophisticated applications like CAD, DTP and multimedia. TRINITRON® CRT models offer greater precision and intricate detail, while Nanao's Invar Shadow Mask Flat Screen CRT models provide a wide display area and lower distortion image. Both CRTs feature our unique built-in Dynamic Beam Spot Control System that ensures maximum brightness and sharp focus.



To reduce glare, eliminate static electricity, and improve the focus level on the display area, Nanao has developed two anti-reflective innovations: ErgoCoat,™ a protective coating for all F-series monitors, and ErgoPanel,™ a sturdy panel that covers the surface of our T-series monitors.



Our user-friendly front control panel incorporates ergonomic design and ease-of-use as well as a variety of powerful options for customizing images.

At Nanao, details make all the difference in creating our family of professional display monitors. From the product design and manufacturing that takes place in our factory to the end user's working environment, Nanao pays attention to every detail. In engineering. Assembly. Product testing. Quality control. Shipping. Customer support. From the very first days of the company, we set out to be an innovator in monitor technology. And, in a few short years, we have achieved that goal. Today, Nanao has the lowest repair rate in the monitor industry, the highest product reliability, and a fast-growing number of enthusiastic customers. So if you're looking for a superior monitor, start with the details. We do.

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Circle 194 on reader service card

Counting the Votes

How did we pick the winners for the 1993 World Class Awards? We didn't—you did. In June, we published a ballot asking readers to vote for products they were familiar with and would recommend based on performance and value. Over the next six weeks, we received more than 18,000 ballots.

As ballots came in, we forwarded them to a San Francisco market research and data processing company, DPAS, which entered the information into a database. Because people describe products in many different ways (a voter might write "Microsoft Word for Windows" or "WinWord" and mean the same thing), sorting out the disparate phrasings of product names was labor intensive. First, we examined the raw data from DPAS, checked and corrected its classification decisions—not once, but three times—and called manufacturers to clarify the distinctions between models with similar names. In some cases, a manufacturer might modify a product slightly but change its name significantly; we grouped these products together. In other cases, model names and numbers might vary only slightly but denote two completely different products; we classified these separately.

We considered each distinct product a separate entrant, even though it would be easier to lump all votes for, say, Hayes modems, into the same category. We believe this is the fairest way to tabulate votes, given the huge number of products that exist in the marketplace. Nevertheless, this approach unquestionably benefits manufacturers with only one or two successful products. Since Microsoft Excel, for example, comes only in a Windows version, its votes are not split across operating systems as are votes for, say, Lotus's 1-2-3. Likewise, those vendors with large and extremely diverse product lines—such as printer, modem, or monitor manufacturers—may have a large number of combined votes, but their individual products do less well in the final tabulation. —*Thomas Gewecke*

slimmest of margins over Microsoft Word for Windows. As last year, Ami Pro came in third, though it closed the gap between itself and the two leaders.

Competitors are giving WordPerfect a run for its money, but there's still a lot of life left in the grandsire of word processors. The package enjoys long-standing support from a huge base of loyal customers like voter Andy Havens, a technical writer from Columbus, Ohio. He calls WordPerfect 5.1 for DOS "probably one of the greatest programs of all time." As James Lewis, principal auditor with Delmarva Power in Newark, Delaware, summarizes, "WordPerfect is almost a religion."

> **Competitors are giving WordPerfect a run for its money, but there's still a lot of life left in the grandsire of word processors.**

At the same time, voter Thompson's depiction of the race between WordPerfect for DOS and Word for Windows at her firm typifies what's happening at many organizations. "We're mostly WordPerfect users in my office, but Word for Windows is catching on. I've converted to Word for Windows and think it wins hands down."

Lotus's Ami Pro 3.0 has its share of strong backers as well. Vince Prugh, who uses Ami Pro to publish a newsletter, *The Garlic Press*, from his San Francisco home, is a former WordPerfect user who switched to Ami Pro 3.0. "I was a WordPerfect for DOS diehard, but the Newsletter Style Sheet in Ami Pro is so easy to use and powerful that I didn't even have to read the manual."

This diversity of passionate feeling is ultimately good news, since it indicates a healthy competition that's bound to make products better and better. Says one observer, "You can't go wrong with any of the top products."

Spreadsheets: Excel by a Landslide

In 1993 the spreadsheet race continued unabated with little change in the lineup. Once again Microsoft Excel won the category hands down. This year, though, both Borland spreadsheets—Quattro Pro for Windows and DOS—edged out both versions of 1-2-3 for second and third place.

Last year, analysts predicted that users might begin dividing their loyalties evenly among the different Windows programs. But Excel's victory proves that it's still the Windows spreadsheet to beat for sheer power and ease of use. Says voter Andy Havens: "Microsoft Excel kicks butt. It does everything I want and lots of things that I wouldn't have thought of myself."

Rookies of the Year

Never before have so many products made it to the top of the World Class charts in the same year they were released. Ten newcomers scored among the top five in their categories.

FIRST PLACE
- **Lotus Improv** November 1992
- **Microsoft Access** November 1992
- **Borland Paradox for Windows** February 1993
- **Adobe Photoshop** April 1993
- **Lotus Organizer 1.0** August 1992

SECOND PLACE
- **Autodesk AutoCAD for Windows** February 1993
- **Borland Quattro Pro for Windows** October 1992

THIRD PLACE
- **Microsoft Windows for Workgroups** November 1992

FOURTH PLACE
- **Microsoft Visual C++** March 1993

FIFTH PLACE
- **Shapeware Visio** November 1992

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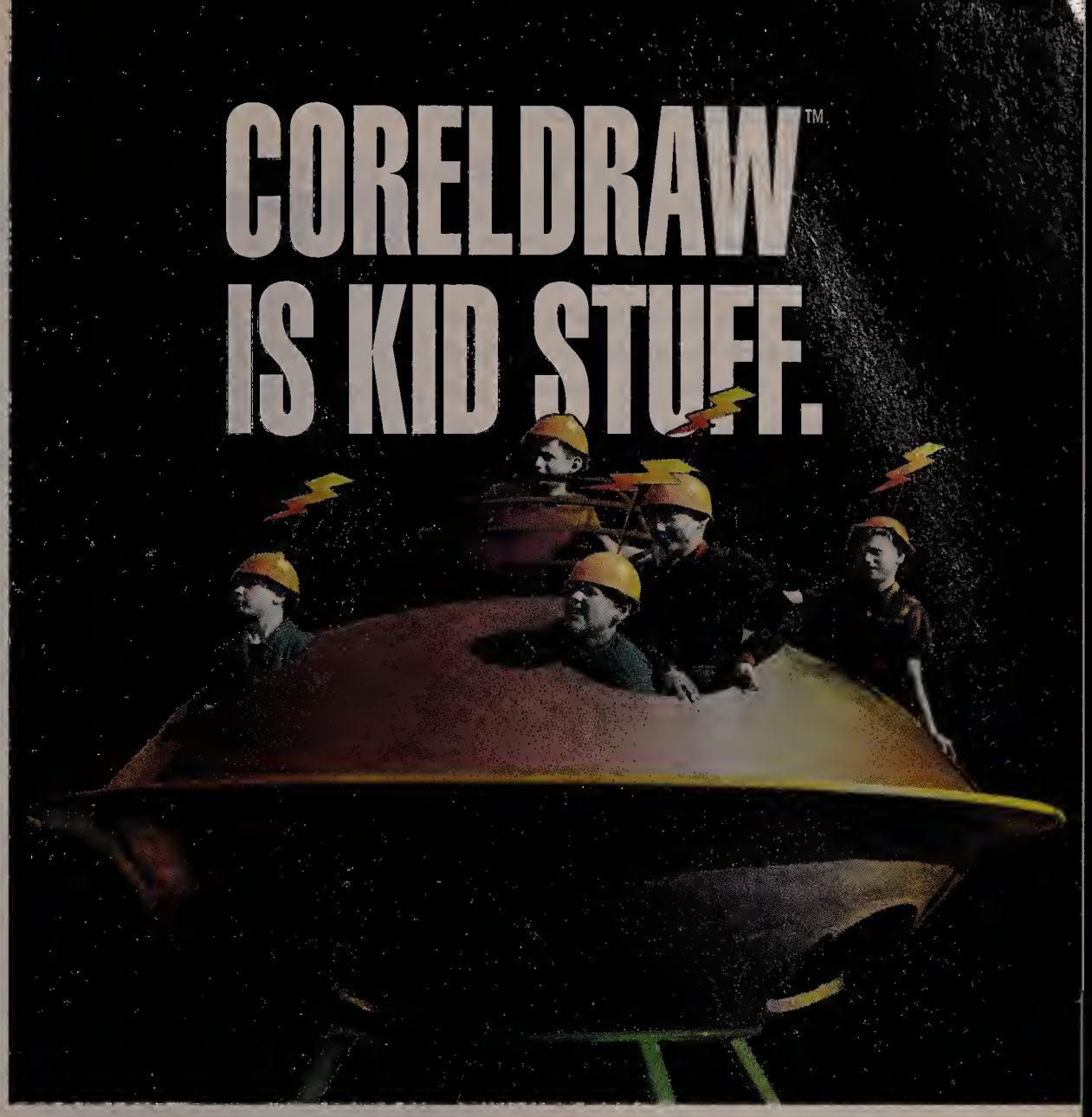

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Circle 76 on reader service card

But far from giving up the race, Lotus is preparing to take on the competition in 1994. Improv 2.0 introduces a whole new approach to data modeling and won the votes of readers in the Most Promising Newcomer category. In place of cell addresses and tangled formulas, it lets users build a single set of formulas using the natural column and row headings in data, and then restructure a model simply by dragging the headings around on the screen. Improv has the kind of chutzpah nonprofessional spreadsheet users love. "Lotus Improv is a much cooler spreadsheet than Excel," says Don Starnes of Don Starnes Film and Tape in San Francisco. "I'm very happy with Excel, but if I started over, I would probably look into Improv."

With the June 1993 release of 1-2-3 4.0 for Windows, Lotus intends to win back the traditional spreadsheet crowd. Its improved interface and core features bring it closer to Excel 4.0, and its Scenario Manager is a unique advance in coordinating spreadsheet activities of many users. Coupled with Lotus's Data Lens technology, release 4.0 makes it possible to link spreadsheet-based and external data seamlessly.

Surprise Winners: Access and Freelance

What does it take for a novice product to win the crowded database race? The Microsoft label and an irresistible price. Microsoft's Access won over longtime winner Paradox for DOS, due at least in part to Access's rock-bottom introductory price of $99. Not to be outdone, though, Borland has come back strong with Paradox for Windows, which tied for first place.

While the price may have been what attracted users to Access, they clearly liked what it bought. "I've done some basic programming in it, and I'm real happy so far," says reader Andrews. "I don't do anything complex at this point, but [Access] definitely suits my purposes." Analysts, however, are far more reserved. "I want to see

The World Class Winners of Tomorrow

(continued from page 159)

items as well as bank and credit card accounts. *Kiplinger's CA-Simply Money 1.0 $69.99; Computer Associates; 516/342-5224.* Reader service no. 632

—Richard Morochove

Zooming In on PDAs

The age of the personal digital assistant (PDA) finally dawned this fall, with the Tandy/Casio Zoomer barely beating the Apple Newton to market. These systems are so new that they didn't make it onto the World Class ballot this year—but don't be surprised to see a host of these palm-size wonders on next year's list.

TANDY'S PEN-BASED ZOOMER—the first PDA—packs a lot in a small format.

The Zoomer's most innovative feature is its use of pen input. You can use either a scratch pad or character recognition (though both may seem slow and imprecise to anyone proficient with a keyboard). And the Zoomer packs a lot of punch into a small space. Its software lineup includes America Online, a dictionary, a calculator, address and date books; a notepad, Quicken, games, and even a personal astrologer. The Zoomer includes a PCMCIA Type 2 expansion slot and an open architecture based on the Geos operating system. The Zoomer isn't perfect yet, and we're still waiting for the host of specialized applications that the new palm-size pal will inspire, but it's the first of a new breed of PC sure to capture users' attention.

Available since this October, the Zoomer (it bears a Casio label) carries a suggested retail price of $899.95. Tandy (Radio Shack) will be selling an identical unit for $200 less. *Zoomer $699.95 from Tandy, $899.95 from Casio; 800/962-2746.* Reader service no. 631

—Joe Abernathy

Presentations Made Easy

Asymetrix got a big jump on the multimedia market when it introduced Compel, built from the ground up to support voice, audio, and animation. The program melds the difficult art of multimedia production with the ease of use associated with presentation software, giving business users quick and easy access to powerful multimedia tools.

Compel has the things you expect from a presentation package—such as background templates and output to overheads and slides—but it excels in creating dynamic, computer-based presentations. You can launch a dramatic video clip when a key frame comes up, or play part of a speech at the click of a mouse. Compel includes a run-time player and compression engine that looks for drivers and customizes playback to the PC it runs on, making it easy to put presentations on disk and take on the road. A well-orchestrated multimedia presentation will surely rouse audiences weary of slide shows, and the low $295 list price ought to open eyes among presenters as well. *Compel $295; Asymetrix Corp.; 800/448-6543; 206/637-1504 (fax).* Reader service no. 634

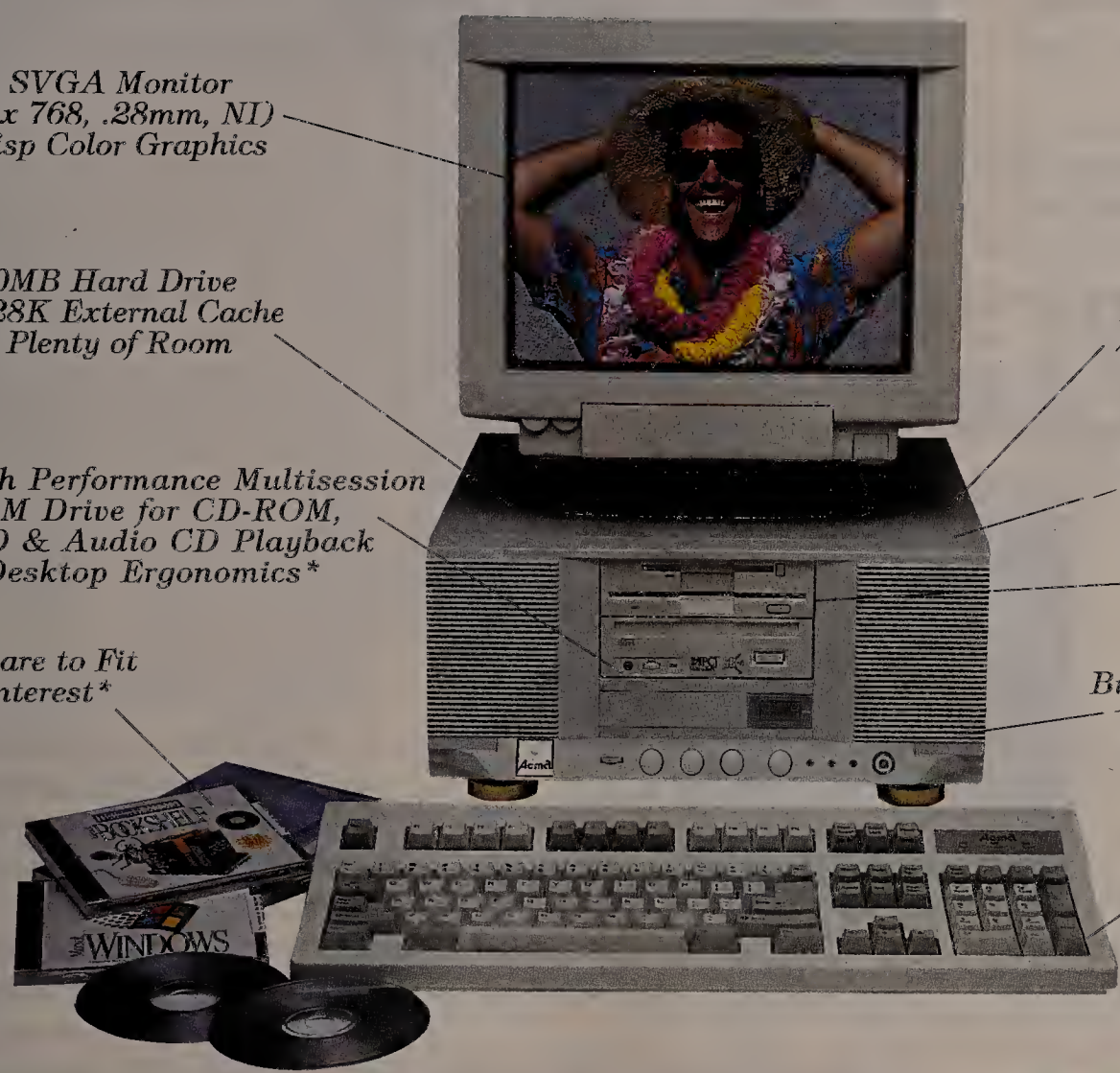
—Michael Desmond

Drawing for the Masses

While perennial favorite CorelDraw remains the one-stop graphics king, new-

(continued on page 166)

Whether for Business, Home or Entertainment, Acma has a Solution to Make You Smile



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what the upgrade rate is on this product before I decide whether it will really replace Paradox as the database of choice," says Wohl.

Another surprise favorite showed up in the presentation graphics category, where longtime winner Harvard Graphics lost the field to upstart Freelance Graphics for Windows. Again, the reason, according to analyst Wohl, is innovation. "Freelance is much easier to use and sexier than anything I run," she says. "Harvard somehow feels like it's just not as—well—modern." Andy Havens says that he switched from Harvard Graphics to Freelance because it's less complex. "Harvard Graphics is good when you want precise, detailed graphics. But if you want straightforward business graphics, you don't want to deal with complexity. Freelance is quick, fast, and easy to use," Havens explains.

Place Your Bets

As this year's World Class votes show, *PC World* readers have a growing interest in innovative, cost-effective solutions. In 1994, vendors will continue to compete harder to come up with low-cost, high-quality products, promising an even more exciting race next year. Once again, the pundits make predictions, but *you* choose the real winners.

Bronwyn Fryer is a contributing editor for PC World.

The 1993 World Class ballots were tabulated by DPAS, a market research firm in San Francisco. Crews McCulloch, a partner at Fryer-McCulloch Communications of Menlo Park, California, freelance writer Richard Morochove, PC World *contributing editors Richard Jantz, Richard Scoville, and Daniel Tynan, assistant editors Michael Desmond, John Goddard, and Dan Miller, East Coast editor Randy Ross, senior editor Joe Abernathy, and executive editor Russell Glitman contributed to this article.* PC World *research manager Thomas Gewecke provided additional research.* **continued on page 168**

The World Class Winners of Tomorrow

(continued from page 164)

comers Aldus IntelliDraw and Shapeware Visio (which squeaked in at number five in the balloting) have dramatically redefined the standard for ease of use in the draw software category. Like CorelDraw, IntelliDraw and Visio are both capable of producing precise illustrations, technical drawings, and information graphics, but their groundbreaking automated drawing tools set them apart from most other programs in this category and make it easier than ever for nonartists to create professional-looking work.

COMPLEX EFFECTS are a point-and-click affair with Fractal Design PainterX2.

With IntelliDraw and Visio, virtually anyone can create a perfectly structured drawing—such as a flowchart, a technical diagram, or a floor plan—with a minimal amount of effort. Both of these programs are powerful and precise, and their point-and-click drawing tools make them remarkably easy to use.

Both programs feature "gluelike" tools that let you attach text labels automatically to both geometric objects and their connecting lines and arrows—which makes creating a flowchart, for example, as easy as stacking Lego building blocks. And since both programs support master shapes, revising drawings is also a breeze: Change a master shape, and every copy of that shape in your drawing changes accordingly.

Although IntelliDraw and Visio can't match all CorelDraw's higher-end artistic tools, such as those for generating color separations, they represent a welcome addition to the draw software category for nonartistic users. ***IntelliDraw 2.0 $199; Aldus Corp. Consumer Division; 619/558-6000.*** **Reader service no. 635** ***Visio 2.0 $129 introductory price through December, $299 thereafter; Shapeware Corp.; 206/521-4500.*** **Reader service no. 636**

—Richard Jantz

Special Effects in a Snap

In last year's World Class Awards, Fractal Design Painter scored well with our readers, despite being brand-new and a little left of center (for one thing, it ships in a paint can). Fractal's new PainterX2 expert extension brings object layering to Painter 2.0—a departure from the traditional techniques for working with images. And Fractal is not the only image editor to snatch up this great idea.

Object layering lets you separate the parts of your image, like pieces of paper in a collage, into a background and a group of objects so you can experiment with composition and filter effects. You can create an object from any part of an image. Once you have the object, click on it to select it. When you use Fractal's effects and brushes, your changes affect only the selected image. You can stack any number of layers and control the opacity of every object.

Tedious and difficult effects that once only graphics gurus could savvy now seem instinctively simple. To create a face peering through a fishbowl, for instance, drag the bowl on top of the face, then fade the opacity of the bowl so you can see through it. The entire editing session, layers intact, can be saved as a RIFF file—Fractal's proprietary format for layered images. You can also save your final works of art to PCX, TIFF, or other formats when you're ready to abandon the layers. ***PainterX2 2.0 $149; Fractal Design; 408/688-5300.*** **Reader service no. 637**

Are you running half a business?

If your accounting isn't right, that's exactly what you're doing.

Now there's help. One-Write Plus® accounting software lets every business have the accurate, complete accounting it needs to succeed. And makes it quick and easy.

One-Write Plus is made especially for small business people unfamiliar with accounting. Or computer software. It's based on the "one-write" manual bookkeeping system – the same system used by over 5-million small businesses because it's so easy to understand.

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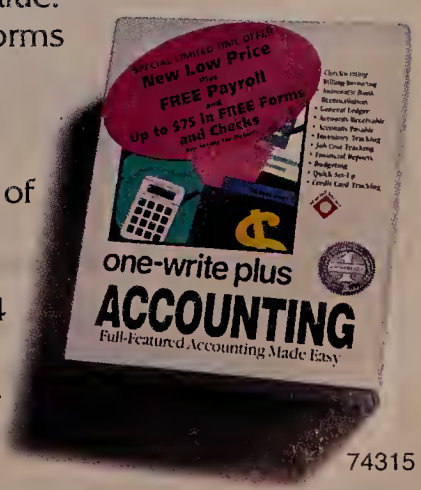
Now do your accounting every bit as well as you run the rest of your business – with One-Write Plus.

Call 1-800-388-4344 for more information or the reseller nearest you.



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Hardware

Laser Printer: Continuing its winning streak in the laser printer category, HP captured the top five spots. Its new LaserJet 4 gets top honors.

Desktop Computer	% of votes
4DX2-66V, Gateway 2000	7
4DX-33, Gateway 2000*	2
4DX2-66, Zeos Int'l	2
4SX-33, Gateway 2000	1
4DX-66, Zeos Int'l	1
Others	87

66 percent of the respondents voted in this category.

Laptop/Notebook Computer	
Nomad 450DXL, Gateway 2000	6
ThinkPad 700C, IBM	6
Toshiba T4400SXC, Toshiba America*	2
Compaq Contura 4/25, Compaq Computer	2
Travel Mate 4000, Texas Instruments	2
Others	82

31 percent of the respondents voted in this category.

Subnotebook Computer	
HandBook, Gateway 2000	15
Contenda 486SL, Zeos Int'l	7
WinBook, Micro Electronics	2
Dell System 320SLi, Dell Computer	2
Contenda 386SL, Zeos Int'l	2
Others	72

10 percent of the respondents voted in this category.

Laser Printer	
HP LaserJet 4, Hewlett-Packard	33
HP LaserJet III, Hewlett-Packard*	7
HP LaserJet IIIP, Hewlett-Packard	7
HP LaserJet 4P, Hewlett-Packard	4
HP LaserJet 4L, Hewlett-Packard	3
Others	46

59 percent of the respondents voted in this category.

Dot Matrix Printer	
Panasonic KX-P1124i, Panasonic*	13
Panasonic KX-P2124, Panasonic	9
Panasonic KX-P2123, Panasonic	7
Epson LQ-570, Epson America	4
Epson LQ-870, Epson America	2
Others	65

42 percent of the respondents voted in this category.

Ink Jet Printer	
HP DeskJet 500, Hewlett-Packard*	23
Canon BJ-200, Canon America	15
Epson Stylus 800, Epson America	8
Canon BJ-10ex, Canon America	4
HP DeskJet 550, Hewlett-Packard	3
Others	47

28 percent of the respondents voted in this category.

Color Printer	
HP DeskJet 550C, Hewlett-Packard	21
HP DeskJet 500C, Hewlett-Packard	19
HP PaintJet XL300, Hewlett-Packard	5
Canon BJC-800, Canon America	3
Phaser 200, Tektronix	3
Others	49

23 percent of the respondents voted in this category.

Monitor	
MultiSync 4FG, NEC Technologies*	6
MultiSync 5FG, NEC Technologies	5
MultiSync 4FGe, NEC Technologies	4
MultiSync 5FGe, NEC Technologies	3
MultiSync 3FGX, NEC Technologies	3
Others	79

46 percent of the respondents voted in this category.

Fax-Modem Board	
SatisFaxtion, Intel*	13
SupraFax Modem v.32 bis, Supra	5
Practical Modem PM14400FX, Practical Peripherals	5
Sportster 14.4, U.S. Robotics†	4
Hayes Optima 144, Hayes Microcomputer Prods.	3
Others	70

26 percent of the respondents voted in this category.

Graphics Accelerator Board	
Graphics Ultra Pro, ATI Technologies*	39
Stealth VRAM, Diamond Computer Systems	12
SpeedStar, Diamond Computer Systems	6
Paradise Accelerator Card, Western Digital	2
Fahrenheit 1280, Orchid Technology	2
Others	39

22 percent of the respondents voted in this category.

Sound Board	
SoundBlaster Pro, Creative Labs	24
SoundBlaster 16 ASP, Creative Labs	20
Pro Audio Spectrum 16, Media Vision	14
SoundBlaster, Creative Labs	10
Pro Audio Spectrum, Media Vision	4
Others	28

27 percent of the respondents voted in this category.

* World Class Winner 1992

† Statistical tie with the entry below.

Hardware Giant: Gateway hardware scored big this year, winning in the desktop, laptop, and subnotebook categories.

Hard Disk Drive

Western Digital Caviar, Western Digital	14
Cheyenne 7213 A/S, Maxtor	5
Seagate ST3283A, Seagate	4
Quantum Pro Drive, Quantum	3
Quantum Hard Card, Quantum	3
Others	71

29 percent of the respondents voted in this category.

Removable/Portable Drive

Bernoulli Transportable MultiDisk 150, Iomega	22
Bernoulli Transportable 90 Pro, Iomega*	17
SyDOS 88/2MB, SyQuest	3
PMO-130, Pinnacle Micro	2
SyDOS 44MB, Syquest	1
Others	55

6 percent of the respondents voted in this category.

CD ROM Drive

MultiSpin 84, NEC Technologies	18
MultiSpin 74, NEC Technologies†	14
TXM-3401E, Toshiba America	13
CDU-7205, Sony	5
CDU-535, Sony	2
Others	48

20 percent of the respondents voted in this category.

Tape Backup Drive

Jumbo 250, Colorado Memory Systems*	48
Jumbo 120, Colorado Memory Systems	11
Tape250 Insider, Iomega	6
Irwin AccuTrak A250, Maynard Electronics	2
Summit SE250, Summit Memory Systems	1
Others	32

23 percent of the respondents voted in this category.

Scanner

ScanMan 256, Logitech*	22
HP ScanJet IIC, Hewlett-Packard	18
Epson ES-800C, Epson America	6
Microtek ScanMaker II, Microtek	4
HP ScanJet IIP, Hewlett-Packard	1
Others	49

18 percent of the respondents voted in this category.

Pointing Device

Microsoft Mouse, Microsoft*	44
MouseMan, Logitech	16
TrackMan, Logitech†	7
Microsoft Mouse 2.0, Microsoft	6
Kraft MicroTrak, Kraft Systems	1
Others	26

34 percent of the respondents voted in this category.

Most Promising Newcomer

Pentium, Intel	12
HP LaserJet 4, Hewlett-Packard	6
Microsoft Mouse 2.0, Microsoft†	3
WinBook, Micro Electronics	2
Fargo Primera, Fargo Electronic Services	2
Others	75

10 percent of the respondents voted in this category.

Best Service and Support

Gateway 2000*	17
Dell	12
IBM	6
Zeos Int'l†	6
Hewlett-Packard	5
Others	54

24 percent of the respondents voted in this category.

Software

Word Processing

WordPerfect, WordPerfect*	23
Microsoft Word for Windows, Microsoft	22
Ami Pro, Lotus Development	20
WordPerfect for Windows, WordPerfect	17
Microsoft Word (DOS), Microsoft	5
Others	13

86 percent of the respondents voted in this category.

Spreadsheet

Microsoft Excel, Microsoft*	34
Quattro Pro for Windows, Borland Int'l	12
Quattro Pro, Borland Int'l	8
1-2-3 for Windows, Lotus Development	8
1-2-3 3.x, Lotus Development	8
Others	30

68 percent of the respondents voted in this category.

Database

Microsoft Access, Microsoft	15
Paradox for Windows, Borland Int'l	15
Paradox, Borland Int'l*	10
dBASE IV, Borland Int'l	8
Alpha Four, Alpha Software	6
Others	46

46 percent of the respondents voted in this category.

Communications

Procomm Plus for Windows, Datastorm Technologies	21
Procomm Plus, Datastorm Technologies*	15
Crosstalk for Windows, DCA	7
Qmodem Pro, Mustang Software	5
Norton PCAnywhere, Symantec	2
Others	50

32 percent of the respondents voted in this category.

Desktop Publishing

PageMaker, Aldus*	42
Microsoft Publisher, Microsoft	15
Ventura Publisher for Windows, Ventura Software†	6
Express Publisher for Windows, Power Up Software	5
Publish It for Windows, Timeworks	3
Others	29

26 percent of the respondents voted in this category.

Font Package

Adobe Type Manager for Windows, Adobe Systems	16
Microsoft Font Pack, Microsoft	12
Typecase, SWFTE Int'l	9
FaceLift, Bitstream	4
MoreFonts, MicroLogic	4
Others	55

18 percent of the respondents voted in this category.

Presentation Graphics

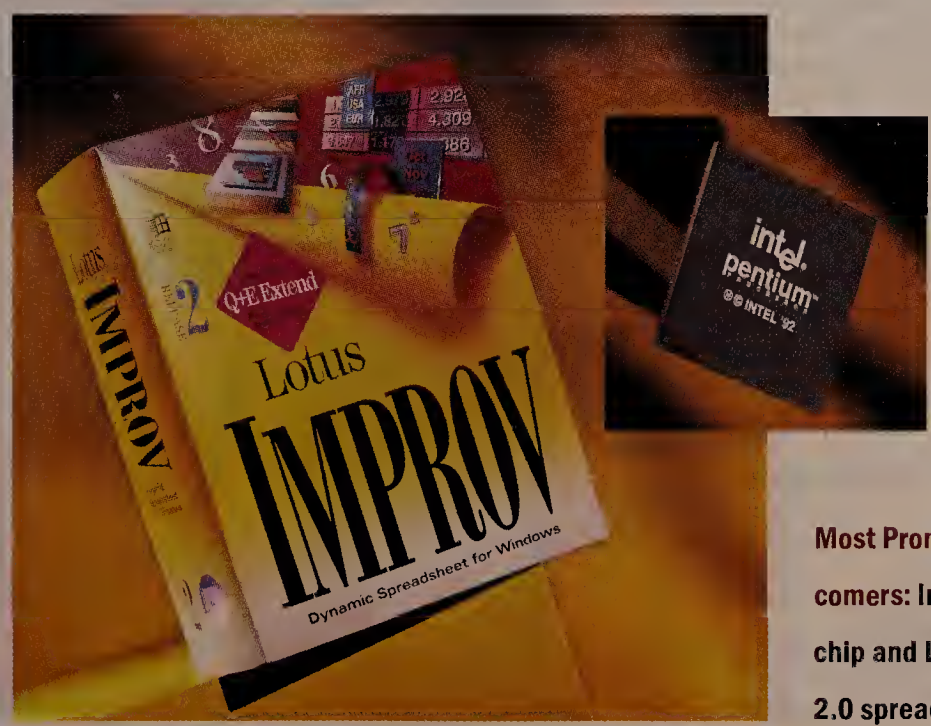
Freelance Graphics for Windows, Lotus Development	12
Harvard Graphics, Software Publishing*	9
Microsoft PowerPoint, Microsoft	9
Harvard Graphics for Windows, Software Publishing	7
CorelDraw, Corel Corp.	6
Others	57

29 percent of the respondents voted in this category.

Draw Software

CorelDraw 4.0, Corel Corp.*	55
Windows Draw, Micrografx	9
WordPerfect Presentations, WordPerfect	3
Micrografx Designer, Micrografx†	3
Visio, Shapeware Corp.	2
Others	28

24 percent of the respondents voted in this category.



Most Promising Newcomers: Intel's Pentium chip and Lotus's Improv 2.0 spreadsheet.

Software

Image Editing/Paint Software	% of votes
Adobe Photoshop, Adobe Systems	17
Aldus Photostyler, Aldus	8
ZSoft Paintbrush, ZSoft	6
Picture Publisher, Micrografx[T]	6
Fractal Design Painter for Windows, Fractal Design	5
Others	57

11 percent of the respondents voted in this category.

Operating System/Environment	
Windows 3.1, Microsoft*	38
DOS 5.0, Microsoft	14
DOS 6.0, Microsoft	9
OS/2 2.1, IBM	9
Windows NT, Microsoft	1
Others	29

54 percent of the respondents voted in this category.

LAN Operating Environment	
NetWare 3.12, Novell	53
LANtastic, Artisoft*	21
Windows for Workgroups, Microsoft	5
VINES, Banyan Systems[T]	3
LAN Manager, Microsoft	2
Others	16

15 percent of the respondents voted in this category.

LAN E-Mail Package	
cc:Mail (DOS), Lotus Development	30
Microsoft Mail (DOS), Microsoft	17
WordPerfect Office, WordPerfect	8
cc:Mail (Windows), Lotus Development	7
Notework, Notework Corp.	4
Others	34

7 percent of the respondents voted in this category.

* World Class Winner 1992

[T] Statistical tie with the entry below.

Fax Software	
WinFax Pro, Delrina Corp.	56
QuickLink II Fax, Smith Micro	3
Faxability, Intel	3
BitFax, Bit Software	3
Eclipse Fax, Eclipse	2
Others	33

21 percent of the respondents voted in this category.

Utility	
Norton Utilities, Symantec*	29
PC Tools (DOS), Central Point	14
Norton Desktop for Windows, Symantec	9
PC Tools for Windows, Central Point	8
Norton Desktop (DOS), Symantec	7
Others	33

44 percent of the respondents voted in this category.

Backup Software	
Central Point Backup (DOS), Central Point*	31
Norton Backup (DOS), Symantec	19
Fastback Plus, Fifth Generation Systems	9
Central Point Backup (Windows), Central Point	6
Norton Backup (Windows), Symantec	5
Others	30

25 percent of the respondents voted in this category.

Forms Software	
FormTool Gold, Bloc Publishing*	33
PerForm Pro, Delrina Corp.	26
FormFiller, Bloc Publishing[T]	4
Form Designer, Superbase[T]	3
FormWorx, Power Up Software	2
Others	32

7 percent of the respondents voted in this category.

OCR Software	
OmniPage Pro, Caere	24
WordScan, Calera Recognition Systems	12
TypeReader, ExperVision[T]	7
CatchWord Pro, Logitech	6
Perceive, Ocron	3
Others	48

5 percent of the respondents voted in this category.

CD ROM Title	
Microsoft Bookshelf, Microsoft	17
Microsoft Encarta, Microsoft[T]	7
Compton's NewMedia's Interactive Encyclopedia	6
CorelDraw, Corel Corp.[T]	4
The New Grolier Multimedia Encyclopedia, Grolier	3
Others	63

10 percent of the respondents voted in this category.

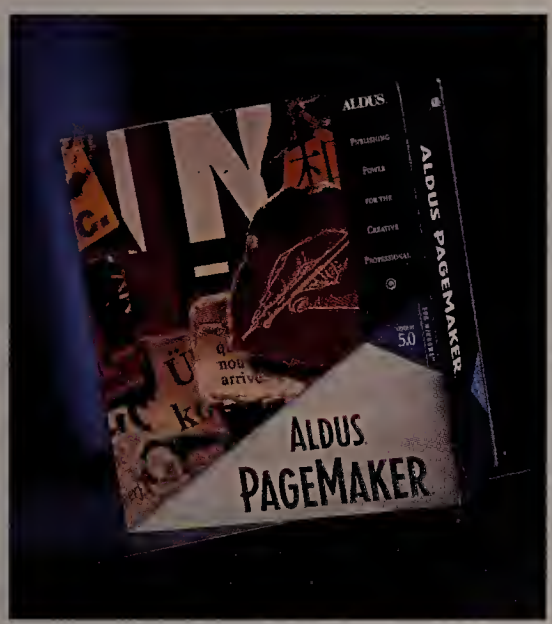
Computer-Aided Design	
AutoCAD (DOS), Autodesk*	32
AutoCAD (Windows), Autodesk[T]	8
DesignCAD, American Small Business Computers	7
Generic CADD, Autodesk	5
Turbo CAD, IMSI	3
Others	45

12 percent of the respondents voted in this category.

Programming Language	
Borland C++, Borland Int'l*	28
Microsoft Visual Basic, Microsoft	12
Turbo Pascal, Borland Int'l	7
Microsoft Visual C++, Microsoft	5
Turbo C++, Borland Int'l	3
Others	45

19 percent of the respondents voted in this category.

Accounting/Personal Finance/Tax Preparation: Between them, ChipSoft and Intuit finished at the top in the accounting, personal finance, and tax-preparation software categories.



Winners by a Landslide: Competitors come and go, but Aldus PageMaker and CorelDraw still rule the draw and desktop publishing categories.

Project Manager

Microsoft Project (Windows), Microsoft*	24
Microsoft Project (DOS), Microsoft	19
TimeLine for Windows, Symantec†	6
TimeLine, Symantec	5
CA-SuperProject, Computer Associates Int'l	3
Others	43

8 percent of the respondents voted in this category.

Personal Information Manager

Organizer, Lotus Development	34
PackRat, Polaris Software*	21
Ascend, Franklin Quest	3
Act for Windows, Contact Software Int'l†	3
InfoSelect for Windows, Micro Logic	2
Others	37

14 percent of the respondents voted in this category.

Accounting

Quicken, Intuit	13
Quicken for Windows, Intuit	9
Peachtree Accounting for Windows, Peachtree	5
DacEasy Accounting (DOS), DacEasy*	3
Peachtree Accounting, Peachtree	3
Others	67

15 percent of the respondents voted in this category.

Personal Finance

Quicken for Windows, Intuit	34
Quicken, Intuit*	13
Andrew Tobias' Managing Your Money, MECA Software	13
MoneyCounts, Parsons Technology	6
Microsoft Money, Microsoft	2
Others	32

33 percent of the respondents voted in this category.

Tax Planning/Preparation

TurboTax for Windows, ChipSoft	11
TurboTax, ChipSoft*	6
Andrew Tobias' TaxCut for Windows, MECA Software†	3
Personal Tax Edge for Windows, Parsons Technology	2
Personal Tax Edge, Parsons Technology	1
Others	77

20 percent of the respondents voted in this category.

Game

Wolfenstein 3-D, Apogee Software	9
Links 386 Pro, Access Software	6
X-Wing, LucasArts Entertainment Co.	6
King's Quest, Sierra On-Line	4
Civilization, MicroProse Software	3
Others	72

29 percent of the respondents voted in this category.

Shareware

PKZip, PKWare†	17
Wolfenstein 3-D, Apogee Software	16
WinZip, Nico Mak	2
ViruScan, McAfee Associates	2
Paint Shop Pro, JASC Software	2
Others	61

18 percent of the respondents voted in this category.

Most Promising Newcomer

Improv, Lotus Development	12
DOS 6.0, Microsoft	9
OS/2 2.1, IBM†	6
Windows NT, Microsoft†	5
1-2-3 for Windows 4.0, Lotus Development	4
Others	64

14 percent of the respondents voted in this category.

Best Service and Support

WordPerfect*	30
Microsoft	23
Lotus	8
Borland	5
Intuit	2
Others	32

21 percent of the respondents voted in this category.

Best Mail-Order Company

Gateway 2000	23
PC Connection*	20
Micro Warehouse	6
Dell	6
Tiger Software	4
Others	41

33 percent of the respondents voted in this category.

Best Online Service/BBS

CompuServe	39
America Online	21
Prodigy	9
GEnie	3
Internet	2
Others	26

26 percent of the respondents voted in this category.

continued on page 174

Taking the Lead: Lotus's Organizer beat out Polaris's PackRat, last year's winner in the PIM category.

Even a *free* memory manager may not be a bargain—especially if it can't give you all the memory you need.

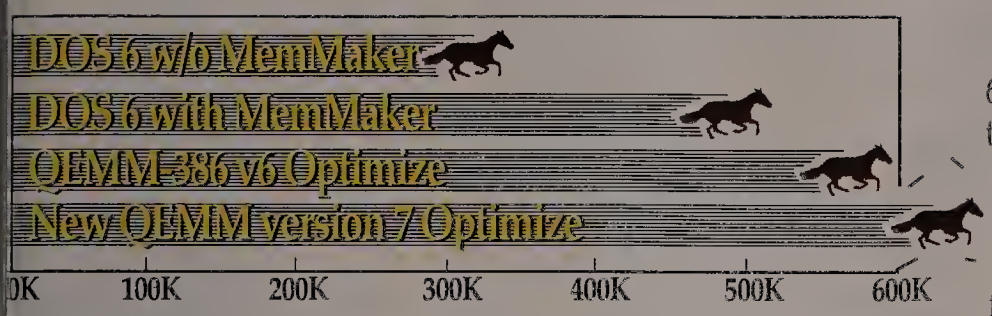
Introducing QEMM 7
The Memory Manager Worth Paying For

The newest version of the Quarterdeck Expanded Memory Manager (QEMM), version 7, once again is extremely innovative in using the critical area between 640K and 1024K. It finds space for more TSRs and drivers in this area than anyone thought possible. It optimizes this area, taking into account the many drivers that need more memory at start-up than when running; instantly calculating millions of possible memory configurations to find still more memory for your programs to use. And it treats the rest of memory as a giant pool to instantly fulfill the needs of all of your programs—whether they use extended or expanded memory. Whether your PC has 1 megabyte or 16, you can benefit from new QEMM 7.

Instant Riches

What does more memory mean in a practical sense? It means that your DOS and MS Windows programs run faster, smoother and more reliably. It means you can continue to add valuable utilities, drivers, TSRs and new capabilities to your PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC has. QEMM 7 lets you have it all without fear of 'out of memory' messages or crashes.

How to Look a Gift Horse in the Mouth



We tested DOS 6 with and without MemMaker and with QEMM 6 and our new QEMM 7 runs away from all of them. See details of test conditions listed below.

DOS 6 Giveth; DOS 6 Taketh Away

The best feature of new DOS 6 is the stable of utilities it includes. Trouble is, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 7-45K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using Microsoft's free memory utility, MemMaker, you could easily end up with a net loss of available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to give you more free memory for your program while taking full advantage of DOS 6. One new QEMM 7 feature, DOS-Up, moves the DOS 6 kernel, its data and resources to memory above 640K (this feature also works with DOS 3-5), freeing 7-70K. Another new QEMM 7 feature, Stealth DoubleSpace, frees 40K of the memory addresses used by DoubleSpace and makes them available for other drivers and TSRs. Both features ensure that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting multiple configurations gives you the flexibility and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.) That's why it makes more sense than ever to put your money on the best memory manager.

Page Frame: the Key to Your Future

There's been a lot of talk about our patent-pending Stealth technology. Jealous talk, mostly. Because nobody else can touch its performance. Our Stealth ROM feature, pioneered in QEMM 6, frees 48-115K of ROM addresses for use by TSRs and drivers. Our Stealth DoubleSpace feature, described above, frees another 40K. And as you might imagine, there's more to come.

Prior versions of QEMM won just about every competition in sight, as well as remaining the #1 best-selling memory manager 5 years straight.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame is used by Lotus 1-2-3 r2.x for larger spreadsheets and WordPerfect 5.x for larger documents, DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games like Wing Commander, Car and Driver, Ultima Underworld II, Wolfenstein and others for fast action. You sacrifice all this when you turn off the page frame (which other memory managers do to maximize available memory above 640K). It's this use of the page frame by Stealth that lets you set up your PC with a mouse, CD ROM, sound board, a network such as Novell NetWare, reserve 8-24K of extra memory for optimal MS Windows performance, use all of DOS 6's memory-hungry utilities and still have more than 630K available for your programs. (Compared to DOS 6's 527K available in the same configuration, after using MemMaker).

There's lots more to QEMM 7:

- Tuned for MS Windows
- New ability to use Vidram inside MS Windows
- DPMI Host
- Pentium Support
- Laptop suspend/resume support
- PS/2 micro channel adapters
- Compaq support
- Fine tuning tools for power users
- 32-bit architecture for speed
- Enhanced compatibility in response to hardware needs of our millions of users:
  - Detects adapter RAM and ROM and bus-mastering hard drive controllers
  - Monitors DMA access into memory
  - Supports Shadow RAM

Easier to use for Novices, More Power for Experts; More Memory for All

Our seventh-generation thoroughbred QEMM has improved ease-of-use, with Express Install and Help features. And for power users, Advanced Install and editable parameters and troubleshooting hints.

And QEMM 7 comes with Manifest, the award-winning memory analyzer—enhanced for more flexibility with Pentium testing, laptop battery reporting, network analysis and editable configuration files.

The new and ever more exciting capabilities coming to your PC will all compete for memory with your favorite applications, TSRs and drivers. And that makes QEMM 7 the front runner in your efforts to get get the best performance out of your PC today—and tomorrow.

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel. (353) (1) 284-1444 Fax: (353) (1) 284-4380

QEMM Users: upgrades are available from dealers.

You can also buy direct from Quarterdeck. Call (800) 354-3222 ext. 1D7 and ask about our special Game Pack offer with your upgrade!

How we got the chart numbers CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0,0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM.

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Adobe Type Manager for Windows
Adobe Systems Inc.
Reader service no. 745

AutoCAD
Autodesk, Inc.
800/964-6432,
415/331-8093 (fax)
Reader service no. 746

Bernoulli Transportable MultiDisk 150
Iomega Corp.
800/777-6179,
801/778-3460 (fax)
Reader service no. 747

Borland C++
Borland Int'l
800/331-0877;
408/431-9000 (fax)
Reader service no. 748

cc:Mail
Lotus Development Corp.
800/343-5414,
617/693-3899 (fax)
Reader service no. 749

Central Point Backup
Central Point Software
800/445-4208,
503/690-8083 (fax)
Reader service no. 750

CompuServe
800/848-8199,
614/529-1610 (fax)
Reader service no. 751

CorelDraw 4.0
Corel Corp.
613/728-8200,
613/728-9790 (fax)
Reader service no. 752

FormTool Gold
Bloc Publishing Corp.
800/888-4437,
305/447-0738 (fax)
Reader service no. 753

Freelance Graphics for Windows
Lotus Development Corp.
Reader service no. 754

Gateway 4DX2-66V
Gateway 2000
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605/232-2023 (fax)
Reader service no. 755

Gateway HandBook
Gateway 2000
Reader service no. 756

Gateway Nomad 450DXL
Gateway 2000
Reader service no. 757

Graphics Ultra Pro
ATI Technologies
416/882-2600,
416/882-2620 (fax)
Reader service no. 758

HP DeskJet 500
Hewlett-Packard
800/752-0900,
800/333-1917 (fax)
Reader service no. 759

HP DeskJet 550C
Hewlett-Packard
Reader service no. 760

HP LaserJet 4
Hewlett-Packard
Reader service no. 761

IBM ThinkPad 700C
IBM PC Co.
800/426-2468,
800/465-1234 (fax)

Improv
Lotus Development Corp.
Reader service no. 763

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Intel Corp.
800/538-3373,
800/525-3019 (fax)
Reader service no. 764

Intel SatisFaxtion
Intel Corp.
Reader service no. 765

Jumbo 250
Colorado Memory Systems
800/845-7905,
303/663-7482 (fax)
Reader service no. 766

Microsoft Access
Microsoft Corp.
800/426-9400,
206/635-6100 (fax)
Reader service no. 767

Microsoft Bookshelf
Microsoft Corp.
Reader service no. 768

Microsoft Excel
Microsoft Corp.
Reader service no. 769

Microsoft Mouse
Microsoft Corp.
Reader service no. 770

Microsoft Project for Windows
Microsoft Corp.
Reader service no. 771

Microsoft Windows 3.1
Microsoft Corp.
Reader service no. 772

MultiSpin 84
NEC Technologies
800/388-8888,
508/635-4695 (fax)
Reader service no. 773

MultiSync 4FG
NEC Technologies
Reader service no. 774

NetWare 3.12
Novell Inc.
800/453-1267,
801/429-5200 (fax)
Reader service no. 775

Norton Utilities
Symantec Corp.
800/441-7234,
800/554-4403 (fax)
Reader service no. 776

OmniPage Pro
Caere Corp.
800/643-3915,
408/395-1994 (fax)
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Organizer
Lotus Development Corp.
Reader service no. 778

PageMaker
Aldus Corp.
206/628-2320,
206/343-3360 (fax)
Reader service no. 779

Panasonic KX-P1124i
Panasonic Communications & Systems Co.
800/742-8086,
201/392-4975 (fax)
Reader service no. 780

Paradox for Windows
Borland Int'l
Reader service no. 781

PKZip
PKWare
414/354-8699,
414/354-8559 (fax)
Reader service no. 782

Procomm Plus for Windows
Datastorm Technologies
314/443-3282,
314/875-0595 (fax)
Reader service no. 783

Quicken, Quicken for Windows
Intuit Corp.
800/624-8742,
415/852-0155 (fax)

ScanMan 256
Logitech Inc.
800/231-7717,
510/792-8901 (fax)
Reader service no. 785

SoundBlaster Pro
Creative Labs, Inc.
408/428-6600,
408/428-6633 (fax)
Reader service no. 786

TurboTax for Windows
ChipSoft Corp.
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800/756-1040 (fax)
Reader service no. 787

Western Digital Caviar
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714/932-4900
Reader service no. 788

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Delrina Corp.
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416/441-0774 (fax)
Reader service no. 789

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Apogee Software Productions
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214/278-4670 (fax)
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WordPerfect Corp.
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Circle 218 on reader service card

The Most 486 for

In this highly competitive group of 486 PCs, the 486DX2-66 is the new king of economy systems. But it's not alone. IBM's Blue Lightning strikes as Ambra's D466BL takes top honors among this month's Best Buys for the budget-minded.

PC prices are no longer in free-fall, but it's still amazing how much computer your dollar can buy. In fact, sometimes it's not easy to tell the difference between a low-cost value system and a power PC. This latest crop of computers tells the story. We asked for systems priced under $2500 and still

PHOTOGRAPHS: MARC SIMON

LEFT TO RIGHT: MIS Promis SL-66, Ambra D466BL, Polywell Poly 4586VR, Eltech Splendor III, Axik Ace Cache 486DX2-66V

Your Money

By Bryan Hastings

received a dozen computers that are based on speedy 66-MHz processors.

We've heard from readers that it's often difficult to find the exact configuration of a system we reviewed. So this month instead of presenting the vendors with our usual detailed configuration list, we trimmed the requirements to the basics. All we asked from each vendor was a 486 system that sells for $2500 or less and can run business Windows applications capably. In other words, we let the vendors send us *their* standard

Testing by Ulrike Diehlmann and Susan Silvius; research and support by Dawn Furseth, John Goddard, and Anita Hamilton

PHOTOGRAPHS: MARC SIMON

configuration as advertised—greatly improving your chances of finding the precise system we review, through the direct market or on dealer shelves.

We cast our net wide and pulled in a richly varied haul. Some systems came with only 4MB of system memory, barely enough to run Windows 3.1, while one came packed with 16MB, enough to maneuver around industrial-strength operating systems such as OS/2 and Windows NT. While some computers had 170MB hard drives, which is fast becoming the minimum standard for Windows, several others with spacious 340MB drives could act as small-workgroup servers. A few systems even included a CD ROM drive, a sound card, or an internal fax-modem.

Most intriguing was the wide range of processors we came across. Seven CPUs from three companies are represented among these 29 systems, ranging from basic 25-MHz 486SXs to powerhouse 66-MHz DX2s. Ambra introduced a system based on IBM's new sensation, the "Blue Lightning" CPU, and Eltech's offering is based on IBM's 486SLC2-66 processor. IBM's two chips are based on Intel's 33-MHz 486SL technology, but Big Blue pumped the internal cache up to 16K and doubled the clock speed to 66 MHz. Even without the internal math coprocessor their Intel counterparts enjoy, the Blue Lightning and the 486SLC2-66 give the 66-MHz DX2s a run for their money—the Ambra and Eltech came in seventh and ninth, respectively, in performance and beat out three DX2-66s.

Kudos to the New Kid on the Block

The number one machine this month comes from Ambra, IBM's new direct-mail offspring. Ambra's mission is to compete with mail-order clone companies, and by setting pricing and system configuration to match or better those of its major competitors, it has seen immediate success. Ambra's system measures up well against its competition on every count and has one extra asset to help it prosper—the legendary service and support of its parent company.

Polywell finished right on the heels of the Ambra, also with a super showing in all areas. Rolling in second in performance, this 66-MHz DX2 PC came with a 340MB hard drive and plenty of drive bays and expansion slots. The other top systems—from Eltech, Axik, and MIS—had similar configurations. Not surprisingly, all Best Buys are based on 66-MHz processors and included 8MB of RAM. All also had 128K or more of secondary cache and a minimum of four free expansion slots. In line with today's high storage requirements, their hard drives were 240MB or larger.

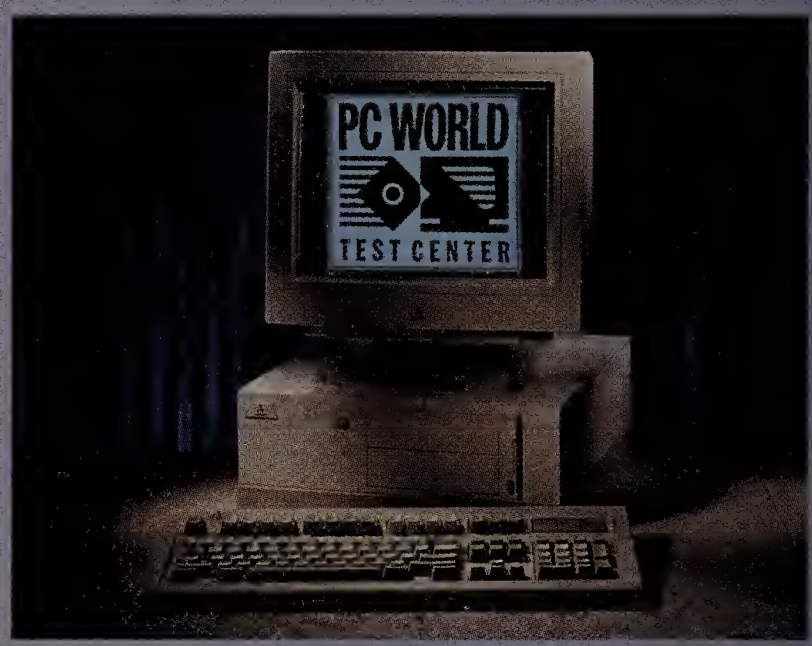
Home PCs

Some systems that don't fare so well when evaluated for business use would make outstanding home systems. A case in point is Compaq's Presario 425, the most Mac-like PC we've seen in both form and function. Its 25-MHz 486SX processor can't plow through demanding business applications the way the 66-MHz powerhouses can, and its upgradability is limited, but the Presario's intuitive interface, super software bundle, and built-in fax-modem–answering machine make it a terrific plug-and-play choice for the beginner. Ditto for the ATI 486DX/33 Multi VL System from Atronics. Its 486DX-33 CPU can't keep up with the fastest processors here, but for less than $2700 you get a system decked out with a sound card, a CD ROM drive, and oodles of CD-based software games, making Atronics's PC an ideal home entertainment system.

Best Buys

The 66-MHz PC is the new king of economy systems—but it doesn't have to be based on Intel's DX2-66 CPU. Systems from newcomer Ambra and from Eltech, based on IBM's new 486SLC2-66 and Blue Lightning 66-MHz chips, captured first and third places this month. All systems included generous helpings of RAM, secondary cache, and hard disk space.

1. **Ambra D466BL** pg. 182
2. **Polywell Poly 4586VR** pg. 202
3. **Eltech Splendor III** pg. 186
4. **Axik Ace Cache 486DX2-66V** pg. 182
5. **MIS Promis SL-66** pg. 194



THE AMBRA D466BL DEBUTS as a smash hit.

Neither of these computers is suitable for use as an office desktop system, however, in a world where resource-hungry Windows applications dominate.

With so many choices and features to consider, how should you go about shopping for a PC? To determine the total worth of a system, consider how well it fits your needs in four areas: performance, price, service and support, and features.

Full Speed Ahead

They may be inexpensive, but how well do these systems perform under full sail? To find out, we put each PC through an industry-standard suite of DOS and Windows tests and through *PC World*'s own suite of Windows tests. The tests evaluate each system's performance running more than a dozen of the most popular word processing, spreadsheet, database, software development, desktop publishing, and graphics applications. What did we find out about these value systems? As usual, the CPU was a prime determinant of performance. Machines based on Intel's 486DX2-66 and IBM's Blue Lightning and 486SLC2-66 processors locked up the top spots in this review, while those using Intel's 486DX-33 and 486SX-33

and Cyrix's Cx486S-40 FasCache processors jockeyed for the next positions. The two 486SX-25 systems ran toward the rear of the pack. Because of the profusion of CPUs available at bargain prices, we simplified your evaluation by comparing all systems to a representative business-class computer. Since the 486DX2-66 processor is rapidly becoming the norm in the office desktop, we based our comparison system on that CPU.

The CPU doesn't tell the whole performance story, however. System RAM and secondary cache RAM also play a major role. For most business computing, aim for at least 8MB of RAM and 64K of secondary cache. A local bus motherboard can also boost overall system performance. Local bus peripherals send data to and receive it from memory at the motherboard's clock speed, such as 25 MHz or 33 MHz, instead of at the dilatory 8-MHz limit the ISA bus imposes. Prime examples of local bus devices are video accelerators and hard disk adapters, which offer snappier displays and faster hard disk access rates than their ISA-based counterparts.

Dollars for Desktops

Given the wide variety of systems, it's no surprise prices range all over the map. NEC's 66-MHz PowerMate costs a steep $2917, well above our $2500 target price, while Diamond's Cx486S-40 system comes in at a downright affordable $1439. The 66-MHz systems generally carry the highest prices, but three—Ambra's D466BL, Comtrade's EISA VLB 486DX2/66, and Eltech's Splendor III—slip in under $2000.

Since we are looking for as much system as possible for $2500, we penalize systems that exceed our price limit and do not excessively reward those that fall far below the limit. We also make every effort to list the price you would expect to pay for a system rather than just a list price. If a system is sold direct, we give the direct price. If a computer is sold through the retail channel, we base our price on vendor estimates.

As a general note, if you buy a system though the mail, we strongly recommend you pay with a credit card. Occasionally buyers pay by check only to find they have no recourse when they receive the wrong system or no system at all, or the vendor goes out of business. We haven't heard any such horror stories concerning the vendors represented here, but using a credit card for mail order makes good sense. If you pay by credit card and a problem arises, you can explain the issue to your card company and quite possibly get the charge removed from your account.

Beyond the Sale

A less obvious but no less important criterion in buying a PC is the service and support that comes with it. What's the point of buying a killer system at a great price if you can't get help when you need it? With that question in mind, we rate companies not only on their service policies but also on how promptly and accurately they fielded our anonymous calls to tech support.

One-year warranties are the absolute minimum acceptable in the PC market these days; most top service and support packages offer two or three years of coverage. Nearly all vendors these days offer on-site service; most include it for no extra charge for one year. Over half these companies offer some sort of weekend tech support, and eight can be reached around the clock seven days a week.

Compaq's and NCR's service and support shines here, as does

Best Performance

IBM's Blue Lightning chip is making a big splash, but for pure performance, Intel's DX2-66 processor still rules the high seas. All of our top performers came with 8MB of RAM and 256K of secondary cache, and most of these top five systems also had VESA local bus on the motherboard.

1. **NEC PowerMate 466** pg. 200
2. **Polywell Poly 4586VR** pg. 202
3. **Everex Step VL EISA DX2/66** pg. 188
4. **MIS Promis SL-66** pg. 194
5. **Axik Ace Cache 486DX2-66V** pg. 182

Best Price

The price leaders ran a close race, with less than $160 separating the $1439 Diamond and the $1595 Tangent and Blackship systems. Budget processors such as the Intel SX and Cyrix dominate, though Blackship carries an especially inexpensive DX-33 unit. Low price doesn't necessarily mean top value, however—none of these systems made our Best Buy chart.

1. **Diamond DT 486C-40 VL** pg. 186
2. **Packard Bell PB 486SX/33** pg. 208
3. **Compaq Presario 425** pg. 204
4. **Blackship BLK 486DX/33 LB** pg. 184
4. **Tangent M440VL** pg. 204

Best Service and Support

NCR and Compaq are familiar faces in this category, and Ambra, an IBM subsidiary, has Big Blue's world-class service and support, but National and MicroSource show they can keep up. Nearly all companies in this top five offer a warranty of two years or better as well as (usually free) on-site service.

1. **NCR 3230 Local Bus** pg. 200
2. **Nat'l MicroComputers 486 VL-Bus Winstation** pg. 194
3. **Compaq Presario 425** pg. 204
4. **Ambra D466BL** pg. 182
5. **MicroSource Tempest 486VLB-66** pg. 194

Ambra's (Ambra gets its support from IBM). National MicroComputers and MicroSource also distinguish themselves in this category.

Rigging Your PC for Extra Power

A PC's upgradability helps determine its overall value. One obvious consideration is the number of drive bays and expansion slots a system has—the more the merrier. Case size is also important, the smaller the better. On the other hand, tower systems tend to offer more expansion than standard desktop systems and compact systems less. Therefore, we rate PCs on their balance of case size and expansion slots.

If a system has local bus expansion slots, so much the better. If you must choose between a proprietary and a VESA local bus system, go with the latter. That way, if both your motherboard and your motherboard vendor go under, you'll be able to find a replacement that can accept your local bus peripherals. All VESA local bus slots can also accommodate standard 16-bit ISA peripherals.

The price of system memory surged recently, so it's more important than ever to know the cost of cramming more RAM into your PC. We look carefully at each system's memory configuration. If a system's eight SIMM sockets are all filled with 1MB SIMMs, you'll need to remove SIMMs to increase RAM above 8MB, which raises your costs. If you're planning to run high-octane operating systems such as Windows NT and OS/2 and need to increase your RAM, you may be better off buying a system that comes with 4MB or 8MB SIMMs, even if you have to pay a slight premium.

SIMM configurations follow exact upgrade paths, which vary from system to system. If you can, figure out how much memory you'll ultimately need. Then ask the vendors exactly what SIMMs you'll need to buy and which you'll need to remove to make way for higher-capacity modules in order to reach your goal.

Last, we note which systems include processor upgrade sockets. These sockets allow you to upgrade to the next-generation CPU quickly and relatively inexpensively without replacing your computer. Some of the lower-power 486 systems, such as the DX-33s, have a 168- or 169-pin socket for the OverDrive chip for 486SX and 486DX, which lets you upgrade to DX2-66 power. Some of the DX2-66 systems have a 237- or 238-pin OverDrive for DX2 socket, designed to accept a Pentium-like upgrade chip when such a processor becomes available.

This exciting concept is tempered by several caveats. First, there are no guarantees that all systems with 237- or 238-pin sockets, especially 486SX systems, will work with Pentium-based upgrade chips expected from Intel the latter half of next year. And while Intel has promised to set up a verification process to determine which specific systems can accept the Pentium-based product and has said it will have some kind of non-Pentium upgrade for other systems, it has yet to provide specifics. Finally, if you upgrade to an OverDrive for DX2, you may need to take steps to keep the chip cool, such as adding an extra fan, since chances are the OverDrive chip will run hot. If you're serious about processor upgrading, avoid systems with upgrade sockets placed in a cramped area.

Whatever your specific needs, one fact is clear: Last year's ultimate power machine is fast becoming the standard for the office PC, and one that should serve you well for years. And as inexpensive as even the DX2-66 systems have become, the advent of Pentium systems will push prices of previous-generation machines down even further. The one dark cloud at the moment is the high price of system memory, but that is expected to drop presently. All this adds up to powerhouse systems priced as desktop bargains. It's clear sailing ahead for shoppers of value PCs.

Bryan Hastings is an associate editor for PC World. *He can be reached on PC World Online (see page 10 for contact information).* PC World *staff members Michael Desmond, Rex Farrance, John Goddard, Anita Hamilton, Owen Linderholm, Dan Miller, and Susan Silvius contributed to this article.*

For more information about all products in this article, circle reader service no. 920.

Acer Acros 486DX2/66

VITAL STATISTICS

Street price: $2299
Processor: Intel 486DX2-66
PROS: Great bundled extras
CONS: Skimpy RAM, limited expandability
Contact: Acer America, 800/733-2237, 408/432-6200
Reader service no. 715

Acer swoops into the low-cost power desktop arena with the Acros 486DX2/66. This snazzy compact is loaded with extras, from an internal fax-modem to bundled business and productivity software. A 15-inch flat-screen monitor and high-performance local bus video round out the package. Add a printer, and you're looking at an instant and inexpensive small office.

Unfortunately, the system proved a disappointment on the test bench. Acer included a generous 256K of cache RAM but stinted where it really counts: conventional RAM. Had the company included 8MB of RAM instead of 4MB, performance would have been enhanced. As it was, the Acros ambled through our Windows benchmarks, running Excel at only half the speed of our comparison DX2-66.

Although the Acros motherboard has local bus video built in, you also get two VESA local bus slots, so you can beef up performance by adding the local bus hard drive and video adapters of your choice. On the downside, two of the three externally accessible drive bays are occupied.

Acer did well in the support category, answering our tech calls nearly perfectly. Toll-free support is available a generous 14 hours per day, including Saturdays. The year of free on-site service is another plus. System warranty is a minimal one year.

For a value system, the Acros is loaded with extras. A number of its competitors offer even more bang for the buck, however, something the system's solid but undistinguished expandability and Acer service and support do not sufficiently offset.

Now It's a Snap To Share Printers & Files

Finally, sharing printers & files among DOS, Windows™ & Macintosh™ computers is as easy as snapping in a phone cord.

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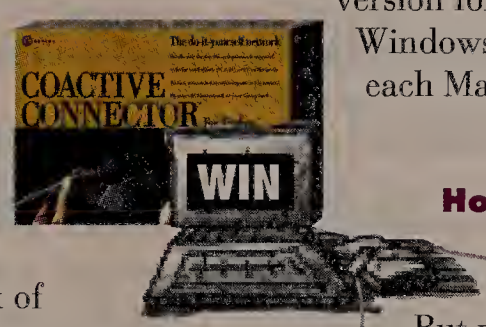
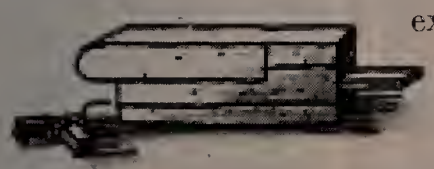
Introducing the Coactive Connector™, specifically designed to network any small office that wants an easy, hassle-free way to share files and printers.



What is the Coactive Connector?
It's a small device you plug into the back of your PC. You attach one Coactive Connector to every computer and install the software. Join them with phone cables and you're done!

How will it help my office?
Imagine sharing the best printer in the office. Whether it's a PC printer or an Apple LaserWriter™. Or, how would you like to use colleagues' files, without leaving your desk or interrupting their work? With Coactive, you can also post a file for others to view and update. Finally, using cross-platform applications like Word or 1-2-3, you can, for example, read DOS or Macintosh files from your Windows PC.



How does it work?
To get or send a file to another computer, you use the commands you already know—open, save, copy, drag 'n' drop—from within the DOS, Windows, or Mac operating system, or a software program. Printing is just as easy, whether you use the printer attached to your PC or other office printers.

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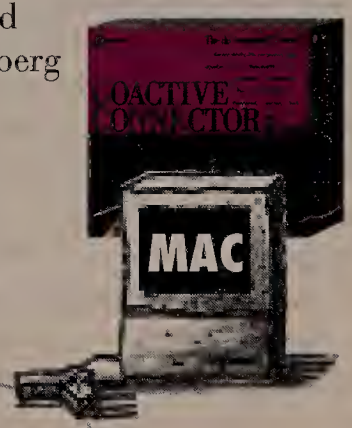
What exactly do I need to buy?
Just count the number of computers in your office and buy one Connector for each. Buy the DOS version for your DOS-only PCs, the Windows version for PCs that have both DOS and Windows, and the Macintosh version for each Macintosh computer.

How do I know I'll like it?
Just try it! It's guaranteed or your money back, no questions asked.

But we're convinced you'll agree with Walter Mossberg of *The Wall Street Journal* (June 17, 1993), who called the Coactive Connector "one of those rare products whose designers made ease of use and practicality their top priority . . . . I found the product a joy to use."



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Circle 18 on reader service card

Ambra D466BL

VITAL STATISTICS

Direct price: $1979
Processor: IBM Blue Lightning
PROS: Great price, expandability, service and support
CONS: None
Contact: Ambra Computer Corp., 800/252-6272, 800/363-0066 (Canada)
Reader service no. 716

Ambra is an IBM spin-off whose goal is to sell richly configured cutting-edge PCs at extremely competitive prices through the direct channel. With the Ambra D466BL, the company hits the bull's-eye. Simply put, this machine has just about everything you could ask for in a desktop PC, which is why it easily earns one of our Best Buy recommendations.

You want performance? This system runs on IBM's new 66-MHz Blue Lightning chip with its full 32-bit interface to the motherboard and whopping 16K of internal cache. The CPU has 8MB of RAM and a 256K cache to work with (the Blue Lightning also has its own 16K internal cache but no internal floating-point unit). Graphics are handled by a speedy ATI VLB Mach 32 card loaded with 2MB VRAM. The result: The Ambra is for all intents and purposes as fast as our 66-MHz DX2 comparison system. It does particularly well in Windows, running 10 and 20 percent faster than our standard system in the Freelance and Paradox segments, respectively. Our conclusion: For Windows, this feature-rich Ambra is a terrific alternative to more-expensive DX2-66s.

You want expandability too? This system can be upgraded in almost every conceivable way. For future speedups, the motherboard comes with a ZIF socket to accommodate the upcoming OverDrive for DX2 chip. Two of the four SIMM sockets are filled, so you can upgrade partway to the system's 64MB limit before you have to yank SIMMs. One VL bus and four ISA slots are free. For storage, the system has a 240MB Maxtor hard drive, but you can connect additional devices such as a CD ROM drive or a scanner to the integrated SCSI-2 adapter; both of the externally accessible 5¼-inch drive bays are free. You want to use it as a client in a workgroup system? The Ambra has a built-in ethernet adapter, and it comes with a copy of Windows for Workgroups in addition to DOS 6.0 and Windows 3.1.

Oh, you want service and support too? Is tech support and field service by IBM good enough? The system is backed by a one-year warranty, a year of free on-site service, 7-day 24-hour tech support, a 30-day money-back guarantee, and a 2-day turnaround policy. Our longest wait for IBM's technical support staff to answer the telephone was 2 minutes.

Sure, we have a few questions about the system. Why do you have to remove the riser card to adjust some jumpers? Why can't you get tech support by fax or BBS? (Ambra says fax support will be available in December.) But these are minor quibbles. For $1979, this is an unbelievably good value and an obvious Best Buy.

AST Bravo LC 4/66d Model 213W

VITAL STATISTICS

Street price: $2479
Processor: Intel 486DX2-66
PROS: Very good Windows performance, good design
CONS: Slow support response
Contact: AST Research 800/876-4278, 714/727-4141
Reader service no. 717

AST has designated its Bravo LC as a value system, targeting buyers who want a quality design from a top-tier vendor but don't want to pay for the extras.

We expected the Bravo LC to hold its own in performance since it's based on the powerful DX2-66 processor and comes with 8MB of RAM and 64K of secondary cache. However, we were pleasantly surprised when it fell only one spot short of Best Buy performance, especially since the AST uses a 16-bit integrated local bus video with 1MB of DRAM instead of the faster (and more expensive) 32-bit local bus and VRAM.

There are three externally accessible drive bays, one 3½ inch that holds a floppy drive, and two free 5¼-inch bays. The single internal bay is filled by a 210MB Maxtor 7213AT drive. Two of the four RAM sockets are populated by 4MB SIMMs, letting you go as high as 40MB without pulling the original SIMMs.

One element of AST's service and support can't be beat—round-the-clock toll-free tech support 7 days a week. The year of free on-site service is also nice. What dragged AST's rating down in this category was sluggish responsiveness; we were stuck on hold longer than we would have liked.

Relatively high price and drawbacks in expansion and service and support keep this AST from being a Best Buy. But if price isn't a major concern, consider this clean performer from a top-line vendor.

Axik Ace Cache 486DX2-66V

VITAL STATISTICS

Direct price: $2198
Processor: Intel 486DX2-66
PROS: Low price, competitive speed, good expandability
CONS: None
Contact: Axik Computer, 800/234-2945, 408/735-1234
Reader service no. 718

If you're looking for top value in a system, you have to consider the Axik Ace Cache 486DX2-66V. It's a no-nonsense PC that combines good performance, the right feature set, and solid service and support, all for a remarkably reasonable price.

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Circle 33 on reader service card

Axik specializes in high-performance systems at low prices—in this case $2198, one of the lowest prices we've seen for a 66-MHz DX2. In fact, the Ace Cache beat our comparison system's performance by about 10 percent overall, doing especially well in the Freelance for Windows and Paradox tests.

The system's solid performance is the product of some basic design choices. The Ace Cache comes standard with a respectable 8MB of RAM expandable to 32MB plus a maxed-out 256K of secondary cache RAM. The 245MB Quantum hard drive hooks up to the rest of the system through a noncaching no-name VL bus IDE adapter. A Diamond Stealth 24 VLB graphics controller with 1MB of DRAM drives an ADI MicroScan 3G monitor, which supports ergonomic refresh rates of 70 Hz or more at resolutions as high as 1026 by 768.

If you want to add some fancier equipment, you can. The CPU sits in a 238-pin ZIF socket, which will let you upgrade to an OverDrive for DX2 processor when it becomes available. Even though the system comes with both floppies, you still have three free externally accessible drive bays (one 3½-inch, two 5¼-inch), so you can add more exotic devices, such as CD ROM and tape backup drives. Both VL bus slots are already occupied, but you have five ISA slots available for other peripherals. One more nice touch—the system comes with a MaxiSwitch programmable keyboard.

This system is backed by a one-year warranty, with free on-site service, 30-day money-back guarantee, a 2-day turnaround policy on repairs, and 12 hours of toll-free support weekdays and Saturday. The result is a rock-solid value—all the performance and features you could ask for in a "low-end" system, with no-worry customer support—which places Axik's contender firmly on our Best Buy list.

Blackship BLK 486DX/33 LB

VITAL STATISTICS

Direct price: $1595
Processor: Intel 486DX-33
PROS: Super price
CONS: No weekend tech support, sluggish performance
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 719

The cost-conscious among you will love the BLK's $1595 price—one of the lowest in this review. If performance is a major consideration, however, Blackship's offering will disappoint. While it's 5 percent faster than the average DX-33—possibly due to its 128K of secondary cache giving extra help to the skimpy 4MB of RAM—the BLK checked in a third slower than our comparison system.

This tiny minitower isn't lacking in upgradability, should you later decide to soup it up. The combo floppy drive leaves you with three free externally accessible drive bays, and inside you'll find a 238-pin ZIF and four free SIMM sockets. Two free 8-bit slots and three empty 16-bit slots could serve you well, should you decide to add an internal modem, a sound card, or other peripherals. A cacheless local bus multi I/O adapter and Color Designer video card take up the box's only local bus slots. Unfortunately, the drive cage partially blocks the empty cache sockets, making the addition of more modules difficult.

Blackship's technicians answered our anonymous support calls cleanly and, aside from one 3-minute wait, immediately. Blackship's one-year warranty and overall policies are basic, but are highlighted by a quick two-day turnaround.

If you're willing to sacrifice speed to get an inexpensive, upgradable system with great technical support, Blackship may have your next PC. It would make a good but basic office system. No matter how you slice it, however, a 486DX-33 simply won't give you the high performance of a 486DX2-66, and you might want to take a look at a Blackship DX2-66 machine.

CompuAdd C433S Low Profile

VITAL STATISTICS

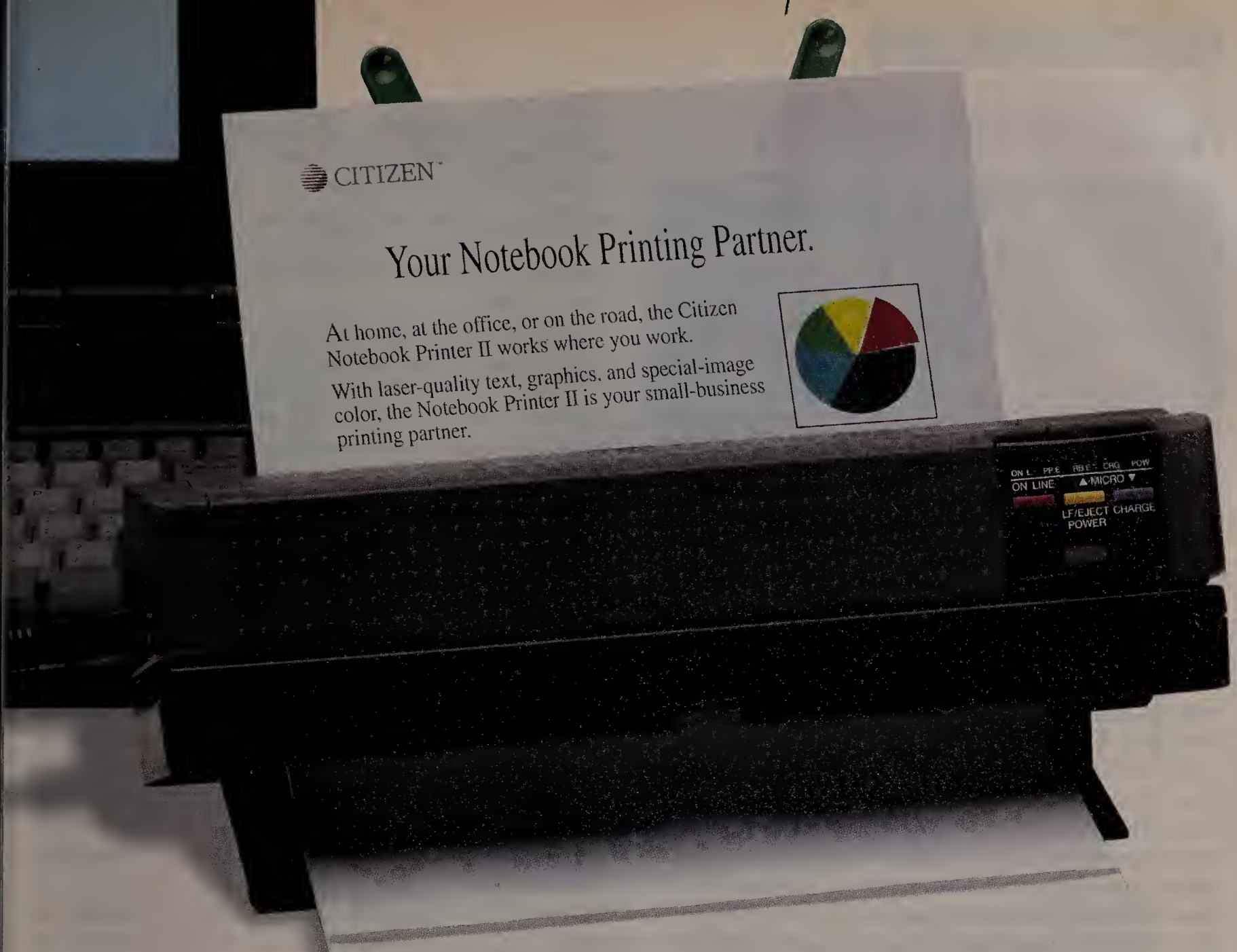
Direct price: $1864
Processor: Intel 486SX-33
PROS: Excellent tech support
CONS: Lacks DX2-66-level performance
Contact: CompuAdd Computer Corp., 800/627-1961, 512/250-1489
Reader service no. 720

For a 486SX-33 system, CompuAdd's entry did pretty well for itself. The gutsy C433S surprised us by outperforming comparable 486DX-33 systems on all our benchmarks—even those involving number crunching. The bottom line, however, is that this system can't match the power of the 66-MHz DX2, which is fast becoming a standard for economy systems.

The C433S's upgrade potential is above average: Procedures detailed and clearly illustrated in the system manual make upgrades a breeze even for the faint of heart. The slimline case opens easily—just remove the thumbscrews. Five free 16-bit ISA expansion slots and two free 5¼-inch externally accessible drive bays give you plenty of room for plug-in peripherals not requiring a local bus. You'll have to remove any full-length expansion cards before you can populate the empty 238-pin OverDrive socket or move up to 2MB of video DRAM, however. And if you plan to pop in an OverDrive for DX2, you could run into trouble with heat dissipation—the empty space above the upgrade socket shrinks ominously once you install more than one full-length expansion card.

CompuAdd is improving its service and support. In addition to its one-year warranty, CompuAdd offers 24-hour phone support seven days a week, a three-day turnaround on repairs, and free on-site service. The crack technical support team answered all our questions expertly with a wait of less than 3 minutes per call.

If hard-core number crunching is not a priority, CompuAdd delivers a promising system. However, even with excellent support and above-par upgradability, its performance kept the C433S from our Best Buy list. It simply has too much competition from the low-cost DX2-66s in this review.



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Circle 113 on reader service card

Comtrade EISA VLB 486DX2/66

VITAL STATISTICS

Direct price: $1999
Processor: Intel 486DX2-66
PROS: Lots of expansion, three-year warranty
CONS: No further CPU upgrade, needs more RAM
Contact: Comtrade, 800/969-2123, 818/961-6688
Reader service no. 721

At first glance this straightforward compact desktop reveals no big surprises, but a few nice touches inside make it more than just your basic clone. The Comtrade EISA VLB is driven by a 486DX2-66 CPU and uses an EISA bus. Despite the high-octane processor, Comtrade equipped it with only 4MB of RAM, which explains why it performed about 10 percent slower than our comparison system. Interestingly, it did well in the Paradox test, possibly because of the hefty 256K of secondary cache and a fast 340MB hard drive.

The Comtrade's expandability looks especially good. This system crams a surprising amount of available expansion space into a small exterior. There are four free EISA slots and three free bays—two externally accessible 5¼-inch and one internal 3½. RAM can be upgraded to an impressive 128MB. There are also two local bus slots. One holds an STB PowerGraph VL-24 video accelerator with 1MB of DRAM, which is used to drive an ordinary 14-inch monitor. The other holds a Morse local bus hard disk adapter.

The price may not be as aggressive as some, but $1999 is good for a 486DX2-66 no matter how you look at it. Comtrade tops that off with fine service and support: A three-year warranty and $30 per year for on-site service are standouts. Had Comtrade added another 4MB RAM for the same price, this PC may well have nudged its way into our top five. The Comtrade merits a hard look, especially if you need a good basic network server for a small work group.

Diamond DT 486C-40 VL

VITAL STATISTICS

Direct price: $1439
Processor: Cyrix Cx486S-40
PROS: Low price, excellent service and support
CONS: Slow
Contact: Diamond Technologies, 800/989-7253, 714/533-9910
Reader service no. 722

If you're prospecting for an inexpensive PC, this system from Diamond could be your lucky strike. At a direct price of just $1439, it's easily the price champion of this review. What's surprising is how much machine you get for the money, especially in terms of service and support and features.

Let's start with Diamond Technologies' excellent service and support package. The company's technical support is particularly impressive; Diamond technicians answered our telephone calls quickly, and their answers were almost perfect on each of the anonymous calls we placed. The Diamond system's warranty covers parts for 15 months and labor for two years. Repairs are turned around in 2 days.

The low price also covers some spiffy hardware. The 212MB Conner hard drive, while perhaps on the small side for some serious Windows users, offers hot performance potential because it's connected to a Promise DC-4030VL bus caching controller. The system also has a second, removable hard drive from Versadrive. The Diamond system's graphics are handled by a CardExpert Cardex W32 VL bus graphics card, which supports noninterlaced resolutions up to 1024 by 768. The small 14-inch CTX monitor that came with the system is up to most of the video board's demands; it can support noninterlaced resolutions as high as 1024 by 768, but it is limited to a 60-Hz refresh rate should you decide that you want to venture beyond 800 by 600.

While the Diamond system comes with a Cyrix Cx486S-40 processor, you can upgrade to an OverDrive for DX2, thanks to the 238-pin ZIF socket. The system comes with 4MB of RAM, but that's upgradable to 128MB, and because just four of the eight SIMM sockets are filled, you won't have to pull any of the original SIMMs if you want to move up to 8MB. The box has two free externally accessible drive bays (one in each size), and three ISA slots are still free.

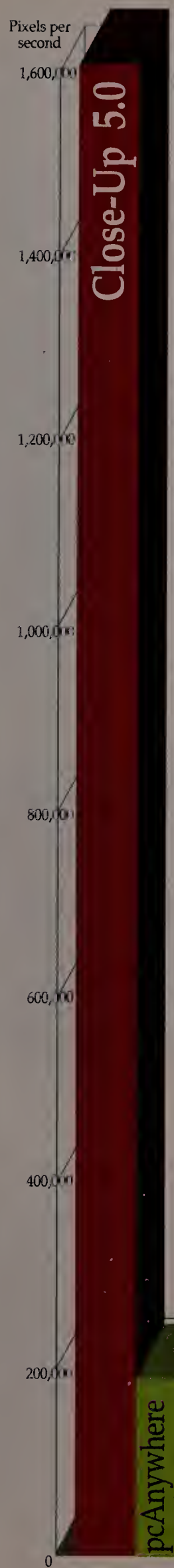
Unfortunately, despite the presence of all this cool hardware, the system's performance just doesn't match that of its cohorts. Considering its Cyrix Cx486S-40 CPU, we knew the Diamond would lag behind our comparison DX2-66 system, but even so we were disappointed. Not only did the Diamond DT 486C-40 VL check in at a mere third the speed of the comparison PC, it also dragged behind other SLC-40 systems that we've tested—by as much as 30 percent in some tests. Given its subpar performance, we can recommend this system only to those for whom price and service are foremost considerations.

Eltech Splendor III

VITAL STATISTICS

Direct price: $1999
Processor: IBM 486SLC2-66
PROS: Low price, solid support, CD ROM drive and sound card
CONS: No CPU upgrade
Contact: Eltech Research, 800/358-8330, 510/438-0990
Reader service no. 723

We're pleased to give you a look at one of Eltech's first production PCs based on IBM's 486SLC2-66 CPU. This system is a real beauty: The IBM-manufactured Alaris motherboard is installed in a handsome minitower set off by a distinctive black case, monitor, keyboard, and mouse. The postage-stamp

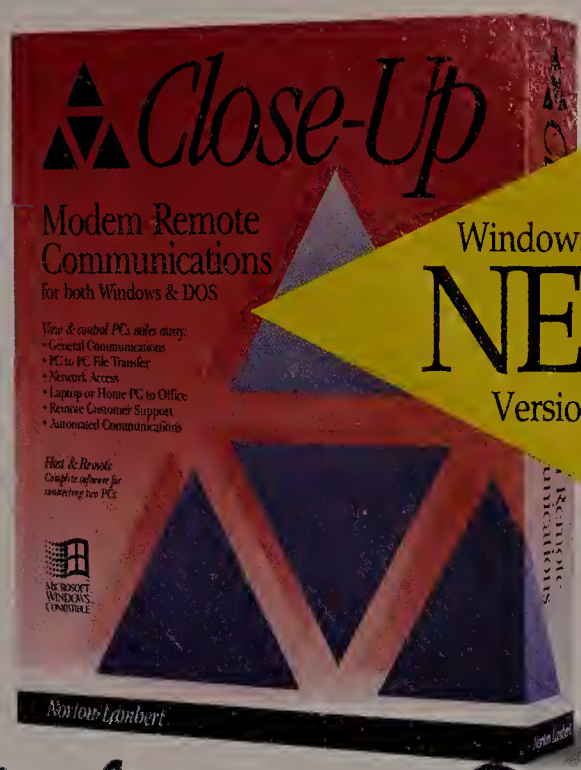


WinBench™ 3.11 by Ziff-Davis Labs Tests Remote Windows™ Speed

This graph shows the speed of the three leading remote control programs when transferring Windows screens. As you can see, Close-Up handles more pixels, faster, meaning you spend less time waiting for Windows screens.

The industry standard test, WinBench 3.11, is perfect for testing the speed of remotes. It is an accurate measure of video throughput. Video throughput is the limiting factor in remote operations, because remote programs must transmit Windows video functions from one PC to the other.

WinBench scores (average of 10 runs):
Close-Up 1,613,118
pcAnywhere 194,093
CarbonCopy 168,397



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We invite you to reproduce this test. We used two identical Gateway 4DX2-66V's with 66-MHz Intel 486DX2-66 CPUs, 16 MB RAM, 256KB RAM cache, 340 MB HD, IDE controller, no hardware disk cache. Video: Local Bus ATI Ultra Pro with 2MB VRAM, 640 by 480 pixels, 16 colors, VGA.DRV dated 3/10/92. Monitor 72 Hz. MS-DOS 5.0, SMARTDRV 2 MB cache. Modems: two 14,400 baud V.32bis. WinBench 3.11 is available on ZiffNet accessible via CompuServe. Test performed without verification by Ziff. All products are shipping versions. WinBench trademark of Ziff Communications Co. Windows trademark of Microsoft Corp.

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Circle 227 on reader service card

66-MHz clock-doubled CPU, soldered onto the VESA/ISA motherboard, provides a big 16K internal RAM cache. Fitted with a 33-MHz IIT coprocessor and maximum 128K secondary RAM cache, the Splendor III's performance in Windows applications compared well with that of the average Intel 486DX2-66. There's no socket for CPU upgrades, but this system's strong performance may well keep you satisfied for some time to come.

Inside, we found two VL bus slots filled with Alaris local bus video and drive cards, and one 8- and four 16-bit slots free. But only one slot (a 16) takes a full-length card easily, though you can squeeze a couple of others in on top of the reset, speaker, and keylock LED connectors. There's a free externally accessible 3½-inch bay, and in our system 4MB SIMMs filled two of the four memory sockets, allowing easy expansion to the 16MB RAM maximum.

You get the fine internal Texel DM-3024 CD ROM player, and Eltech also throws in a Thunder Media Spectrum 16 sound card, a pair of speakers, Works for Windows 2.0, and other CD ROM titles. Not bad perks for a $1999 PC with two floppy drives and a 250MB hard drive, especially considering that the excellent video and monitor setup supports noninterlaced 1024 by 768 output for great multimedia visuals. Service and support includes a $69 yearly on-site option. You can access toll-free technical help just 8½ hours each weekday, but the responsiveness and the quality of the support are way above average.

If you want the high RAM ceiling, secondary cache expandability, and upgradability necessary to ensure a painless progression to the next generation of operating systems, this system isn't your cup of tea. But for users satisfied with today's Windows applications, this PC's a super deal and one that easily makes our Best Buy list.

Everex Step VL EISA DX2/66

VITAL STATISTICS

Street price: $2663
Processor: Intel 486DX2-66
PROS: Excellent performance
CONS: High price, no toll-free technical support
Contact: Everex Systems, 800/821-0806, 510/498-1111
Reader service no. 724

Although still in Chapter 11, Everex is definitely a factor on the playing field, paring product lines and focusing on its redesigned Step VL system line.

Ranking third in performance this month, the VL EISA is one of the faster DX2-66s we've seen this year. We saw an overall 8 percent performance advantage over our comparison DX2-66, and the system fared even better with graphics applications and Microsoft's Word for Windows and Excel, thanks to a hefty 2MB IDE disk caching controller and a 256 secondary RAM cache. The video system is excellent: A 15-inch monitor is driven by a 32-bit Diamond Viper VLB loaded with 2MB VRAM, giving sharp, crisp displays even at super-VGA resolutions. Everex's fast 240MB hard drive is roomy enough for most Windows users. The crisp-feeling keyboard and well-organized documentation add to user comfort.

Upgrade options are superb, especially for a compact desktop. With three unfilled externally accessible drive bays and five free 32-bit EISA slots under the hood, you have plenty of room to build up your dream machine or small–work-group server. For starters, you'll find a 238-pin ZIF socket for Intel's OverDrive for DX2 upgrade and an unusual 16-socket memory array that can be upgraded to an incredible 256MB. Eight RAM sockets are populated by 1MB SIMMs, leaving the eight remaining sockets free.

All Everex products these days are serviced by NCR. Everex's two-year warranty includes free technical support for the lifetime of your system and one year of free on-site support, backed by a quick two-day turnaround for repairs. While the 10-hour technical support is fast and flawless, you'll pay a toll call to reach the technicians, and there is no weekend support.

Unfortunately, Everex's system does not come cheap. This 32-bit EISA machine may gun through graphics and business applications, but at nearly $2700 on the street, its high price may have you fumbling your wallet. Even so, this machine's many talents put it within sprinting distance of this month's all-pro players. Consider putting the Step VL EISA DX2/66 on your draft list, especially if you're in the market for a solid server.

Insight 486DX2-66 VL

VITAL STATISTICS

Direct price: $2199
Processor: Intel 486DX2-66
PROS: Excellent design and expandability
CONS: Below-average performance for a DX2-66
Contact: Insight, 800/927-7848, 602/902-1176
Reader service no. 725

Talk about a study in contrasts. The Insight 486DX2-66 VL system took us on a turbulent roller coaster ride, achieving some impressive heights and plunging to a few unfortunate lows during the course of our evaluation.

At $2199, this system is one of the least-expensive DX2-66s available. It didn't, however, break any speed records in our applications suite, lagging behind our comparison DX2-66 in the Windows tests and most especially in the BAPCo segments where it ran almost 25 percent slower than the comparison system. We're not sure why, since the system comes well stocked with 8MB of RAM, VESA local bus hard disk adapter and graphics accelerator, and 128K of secondary cache RAM (previous tests have shown that performance with the typical 256K maximum of cache RAM is only a few points better than with 128K).

Despite its disappointing performance, this desktop system displays flashes of brilliance. A look under the hood reveals a thoughtfully laid out motherboard with eight expansion cards (two VL bus, six ISA) and three drive bays—the kind of expandability we expect more from a minitower than from a svelte desktop unit. In addition, the motherboard is clear of snarled cables, **continued on page 193**

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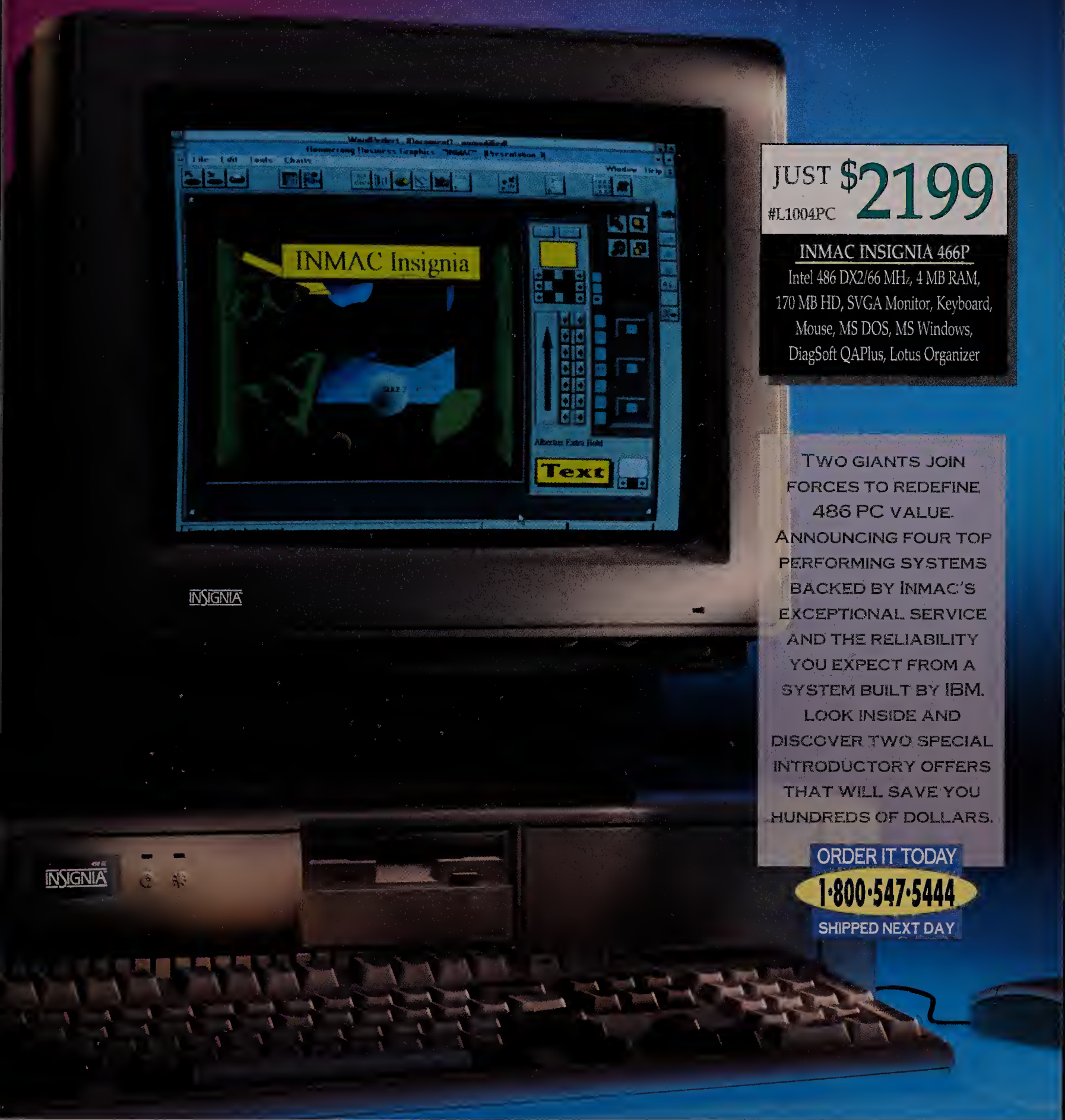

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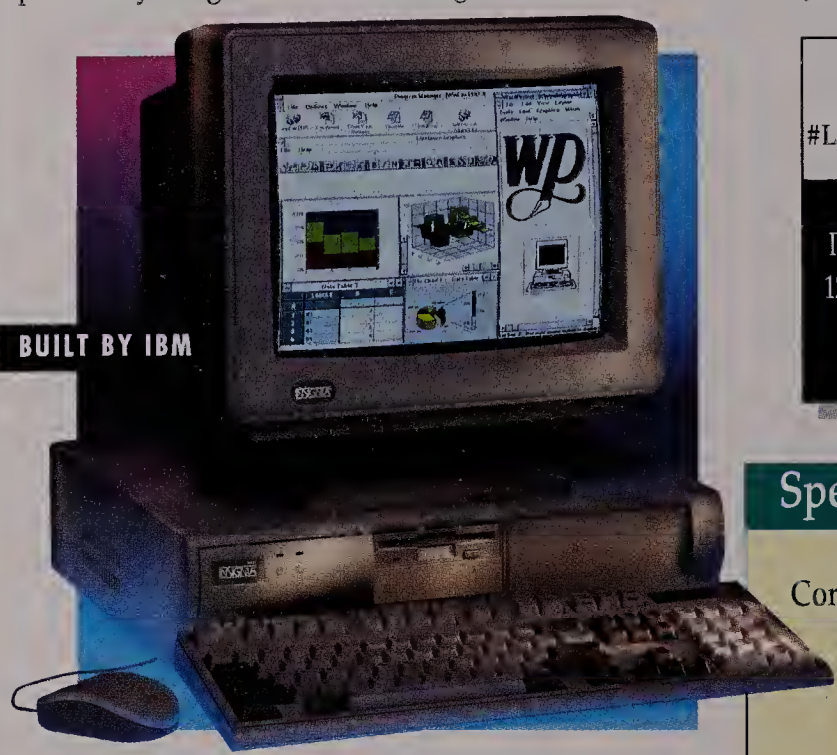

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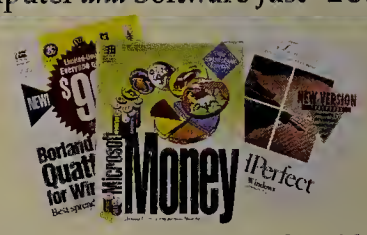

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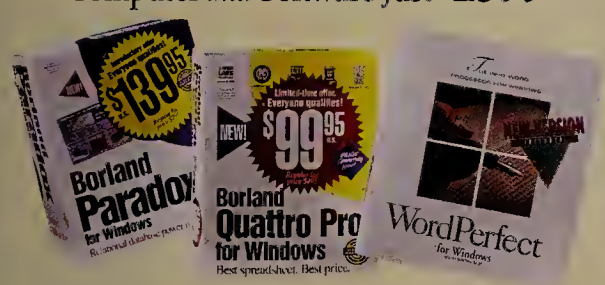

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- Paradox for Windows
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SYSTEM

The systems below are preconfigured with four drive bays; five ISA expansion slots; two serial ports; one parallel port; keyboard; mouse; MS DOS; MS Windows; DiagSoft QAPlus; Lotus Organizer.

1 ☐ INMAC INSIGNIA 450SL IBM basic system with IBM 486SLC2 25/50 MHz CPU; 16 KB internal cache

2 ☐ INMAC INSIGNIA 433P basic system with Intel 486 DX/33 MHz CPU; 8 KB Write-thru cache

3 ☐ INMAC INSIGNIA 450P basic system with Intel 486 DX2/50 25/50 MHz CPU; 8 KB Write-thru cache

4 ☐ INMAC INSIGNIA 466P basic system with Intel 486 DX2/66 33/66 MHz CPU; 8 KB Write-thru cache

MEMORY

(Must check one RAM selection)

5 ☐ 4 MB RAM

6 ☐ 8 MB RAM

7 ☐ 16 MB RAM

8 ☐ 32 MB RAM

9 ☐ 64 MB RAM (not available on 450SL)

10 ☐ 128 KB cache

11 ☐ 256 KB cache

MONITORS

12 ☐ SVGA Monitor 14", .28 1024 x 768 NI

13 ☐ SVGA Monitor 17", .28 1024 x 768 NI

DRIVES/SCSI ADAPTER

HARD DRIVE *(Check one)*

15 ☐ 120 MB

16 ☐ 170 MB

17 ☐ 255 MB

18 ☐ 340 MB

19 ☐ 540 MB*

20 ☐ 1GB*

FLOPPY DRIVE *(Must check dual or 3½")*

21 ☐ DUAL FLOPPY DRIVE 3½" & 5¼" (single drive bay)

22 ☐ 3½" FLOPPY DRIVE

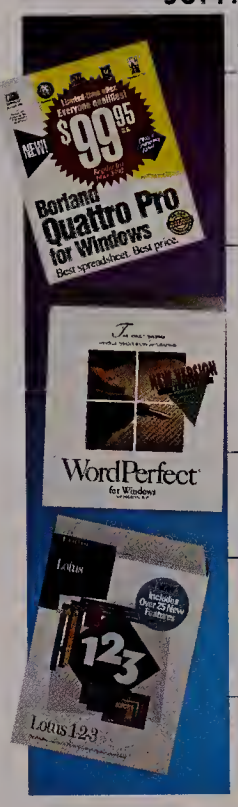
23 ☐ 5¼" FLOPPY DRIVE (as second drive)

24 ☐ SCSI ADAPTER

** Requires SCSI adapters.*

SOFTWARE

We will install the latest version available at time of shipment.



WORD PROCESSING

25 ☐ MICROSOFT WORD FOR WINDOWS

26 ☐ WORDPERFECT FOR WINDOWS

27 ☐ LOTUS AMI PRO FOR WINDOWS

SPREADSHEETS/FINANCE

28 ☐ MICROSOFT EXCEL FOR WINDOWS

29 ☐ LOTUS 1-2-3 FOR WINDOWS

30 ☐ BORLAND QUATTRO PRO FOR WINDOWS

31 ☐ MICROSOFT MONEY

DATABASE MANAGEMENT

32 ☐ BORLAND PARADOX FOR WINDOWS

PRESENTATION GRAPHICS

33 ☐ MICROSOFT POWERPOINT FOR WINDOWS

34 ☐ LOTUS FREELANCE FOR WINDOWS

INTEGRATED OFFICE APPLICATIONS

35 ☐ MICROSOFT OFFICE: Word, Excel, PowerPoint, Mail

36 ☐ LOTUS SMART SUITE: Ami Pro, 1-2-3, Freelance, cc:Mail

37 ☐ BORLAND OFFICE: WordPerfect, Quattro Pro, Paradox

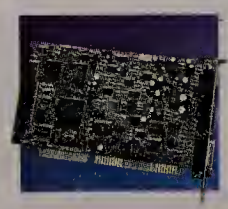
NETWORKING

38 ☐ 3COM ETHERLINK III COMBO (AUI, TP, BNC)

39 ☐ INTERNAL 9600/2400 FAX/MODEM

40 ☐ INTERNAL 14.4 K BAUD FAX/MODEM

MULTIMEDIA



41 ☐ INTERNAL CD-ROM DRIVE

42 ☐ CREATIVE LABS SOUND BLASTER 16

43 ☐ MEDIA VISION PRO AUDIO SPECTRUM 16

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CIRCLE #116 ON READER SERVICE CARD

FAX FOR QUOTATION 1-800-972-3210

and rear ports are marked for easy identification. System memory enjoys plenty of headroom—you can stuff in 128MB. Unfortunately, the 8MB of RAM fills all the SIMM slots, forcing you to pull out eight good SIMMs to add memory. Secondary cache is upgradable to 256K, but anyone choosing to upgrade will encounter the one design flaw we found: The cache sockets lie directly below the hard drive and the 3½-inch floppy drive, making the upgrade a bit cumbersome.

Insight suffered in our service and support ratings. While technicians answered our questions perfectly, they failed to return our calls on four out of five attempts. The support package has some appealing aspects, such as an around-the-clock toll-free phone line and a 30-day money-back guarantee, but the system comes with a minimal one-year warranty, and the company offers neither on-site service nor a guaranteed turnaround time for repairs.

Logisys L-Windows 486DX/33

VITAL STATISTICS

Direct price: $2250
Processor: Intel 486DX-33
PROS: Removable hard drive, generous two-year warranty
CONS: Flimsy motherboard support
Contact: Logisys, 800/333-5679, 714/693-1888
Reader service no. 726

The venerable Intel 486DX-33 is *still* going strong, and it's still suitable for many business applications. So we approached the big tower Logisys L-Windows 486DX/33 with an open mind. As expected, this PC's performance didn't match that of our average 486DX2-66—although its 128K secondary cache expandable to 256K and VL bus IDE drive adapter and graphics controllers did make for respectable 33-MHz performance.

This PC comes with both floppy formats and a 212MB hard disk. In addition, you get a nifty little 80MB removable hard drive—handy for use as a single data drive with home and work PCs (as long as you install the drive docking unit in both). Removable drives also let you lock up sensitive files when they're not in use. And the controller has an external port for connecting an external IDE drive. Not bad for $2250 direct.

A lot of users will be happy with four free 16-bit slots, one free externally accessible drive bay, three free hard drive bays, and an upgrade path to OverDrive for DX2. But the memory configuration leaves something to be desired. All eight RAM sockets are filled with 1MB SIMMs, and bumping the memory up to 16MB—the next supported increment—requires removing all the installed RAM and replacing it with four 4MB SIMMs. Other drawbacks include a poor design element that allows the motherboard to flex too much when you're upgrading the secondary cache or CPU.

Service and support includes an attractive two-year warranty, but you'll have to pay $100 for an on-site policy. Tech support is available 9 hours a day weekdays only. All our calls were answered immediately, but more than half our questions weren't answered satisfactorily. Despite the good price, storage extras, and good warranty, the design and assembly shortfalls are crucial. Logisys needs to put together a better package to earn our recommendation.

Micro Express MicroFlex-VL/S

VITAL STATISTICS

Direct price: $1999
Processor: Cyrix Cx486S-40
PROS: Good expansion and service
CONS: Middling performance
Contact: Micro Express, 800/989-9900, 714/852-1400
Reader service no. 727

This system is a supercharged version of the system from Micro Express that won a Best Buy in our June issue this year. That system came in at under $1200 but lacked some of the extras that Micro Express throws in this time. This system is based on Cyrix's Cx486S-40 microprocessor, which is very roughly equivalent to an Intel 486DX-33. To give it a boost, Micro Express equipped this midpowered minitower with a huge 16MB of RAM, coupled with a decent 220MB hard drive and 256K of secondary cache.

But while this system heaps lots of extras around the plate, it fails to deliver the bacon. It stacks up well next to its 486DX-33 and 486DLC-40 peers, but the DLC-40 processor just isn't a match for the DX2-66, which is rapidly becoming a standard. The MicroFlex-VL/S finished in the bottom half of the review on performance, more than 30 percent behind our comparison system.

Micro Express did leave a decent CPU upgrade path—including a ZIF 238-pin OverDrive for DX2 socket. Three drive bays remain free after you fit in the hard drive, the 3½-inch floppy drive, and the 5¼-inch floppy drive, and all three bays are externally accessible. The system uses an ISA bus and has five free full-length 16-bit slots. In addition you'll find two 32-bit VL bus slots, one holding a Diamond Viper VLB graphics card with 2MB of VRAM and the other a 1MB Promise VLB caching controller. Unfortunately, the 14-inch monitor can't do justice to the highest resolutions that the powerful Viper offers.

Micro Express has traditionally done well in service and support, and this outing is no exception. The staff answered our questions promptly and accurately—cap this achievement with a two-year warranty, plus on-site service for $50 per year. The downside: For tech support evenings and weekends, you must leave a phone message and wait for a callback.

The $1999 price is about the same as that of several DX2-66s in this review, but for that money you get a lot of extra RAM, a good-size hard drive, and a great video board. We recommend you look at the system if you want a basic or entry-level desktop unit, and then get Micro Express to cut back a little on the features. Drop the RAM to 8MB to save a few hundred dollars and consider getting slightly less secondary cache or less VRAM on the video board. If you are looking for something with a bit more meat, however, check out one of the faster systems in this review.

MicroSource Tempest 486VLB-66

VITAL STATISTICS

Direct price: $2499
Processor: Intel 486DX2-66
PROS: Great service and support, super monitor, very good performance
CONS: Cluttered interior
Contact: MicroSource, 800/848-5161, 818/858-5161
Reader service no. 728

High-quality service and support distinguish MicroSource's Tempest 486VLB-66 system. You get a two-year warranty, Saturday telephone support, and prompt, helpful responses from the company's technicians.

Despite the system's stormy name, you can expect a smooth ride with this local bus 486DX2-66. Both price and performance are comparable to those of our comparison DX2-66. Actually, we were surprised performance wasn't stronger, given the selection of speed-enhancing components, such as 256K of secondary cache, a 512K caching controller, and a top-of-the-line Diamond Viper VLB local bus video card loaded with 2MB of DRAM. The classy Mag MX15F 15-inch monitor—a December 1992 *PC World* Best Buy—impressed us as well.

The Tempest's design and upgradability could use some improvement. As with many clones we encounter, unbound cables running from the adapter card to the drives and ports are a nuisance. The SIMM sockets are filled with 1MB modules, and you won't find a CPU upgrade socket or free internal drive bay. Push the cables aside, and you will find two free externally accessible bays and four free slots—three 16-bit and one local bus.

The MicroSource Tempest 486VLB-66 is a solid performer with quality support—it's just that you pay more for what you get than with our Best Buy systems.

MIS Promis SL-66

VITAL STATISTICS

Direct price: $2499
Processor: Intel 486DX2-66
PROS: Hot performance
CONS: Somewhat pricey, no free drive bays
Contact: MIS Computer Systems, 800/733-9188, 408/730-9188
Reader service no. 729

MIS Computer Systems really delivered on its Promis SL-66. True, the machine's $2499 direct price is higher than that of most systems here (albeit below our $2500 cap). However, MIS provided excellent service and support plus the key components to ensure top-notch performance—and a place for its Promis SL-66 desktop computer among our Best Buy systems this month.

The SL-66 comes with plenty of muscle to power demanding Windows applications. Its fast 66-MHz 486DX2 processor is amply complemented by 8MB of RAM and 256K of secondary cache. With this clout, the Promis SL-66 placed fourth in our applications test suite, posting scores almost 15 percent better than those of our comparison DX2-66.

The MIS Promis SL-66's 240MB hard drive is well above minimum for Windows users, and the internal fax-modem with WinFax Lite software turns this system into a great home-office machine. The Promis SL-66 also packs plenty of graphics punch by using an S3 805 local bus video accelerator chip, which should meet the needs of all but the most demanding users. While the 14-inch CTX monitor that came with the machine is on the small side, it delivers clear images.

The SL-66 provides adequate elbow room for expansion, offering three free ISA slots and one free VL bus slot. The free VL bus slot allows users to keep their graphics options open for the next generation of graphics accelerators or to speed up hard disk access. Installing additional drives can be a problem, however, since only one 3½-inch bay is available.

MIS service looks very good. Support answered all our questions quickly and correctly, and there was no problem getting through to a representative. Combine that record with toll-free technical support, cheap $20 on-site service, and a rapid one-day turnaround, and you get a solid all-around package.

However, it is all-around quality plus excellent performance that elevates this MIS Promis system to Best Buy status. We would prefer to see the system topped off with a better monitor, but even without it this unit still stands out.

National MicroComputers 486 VL-Bus Winstation

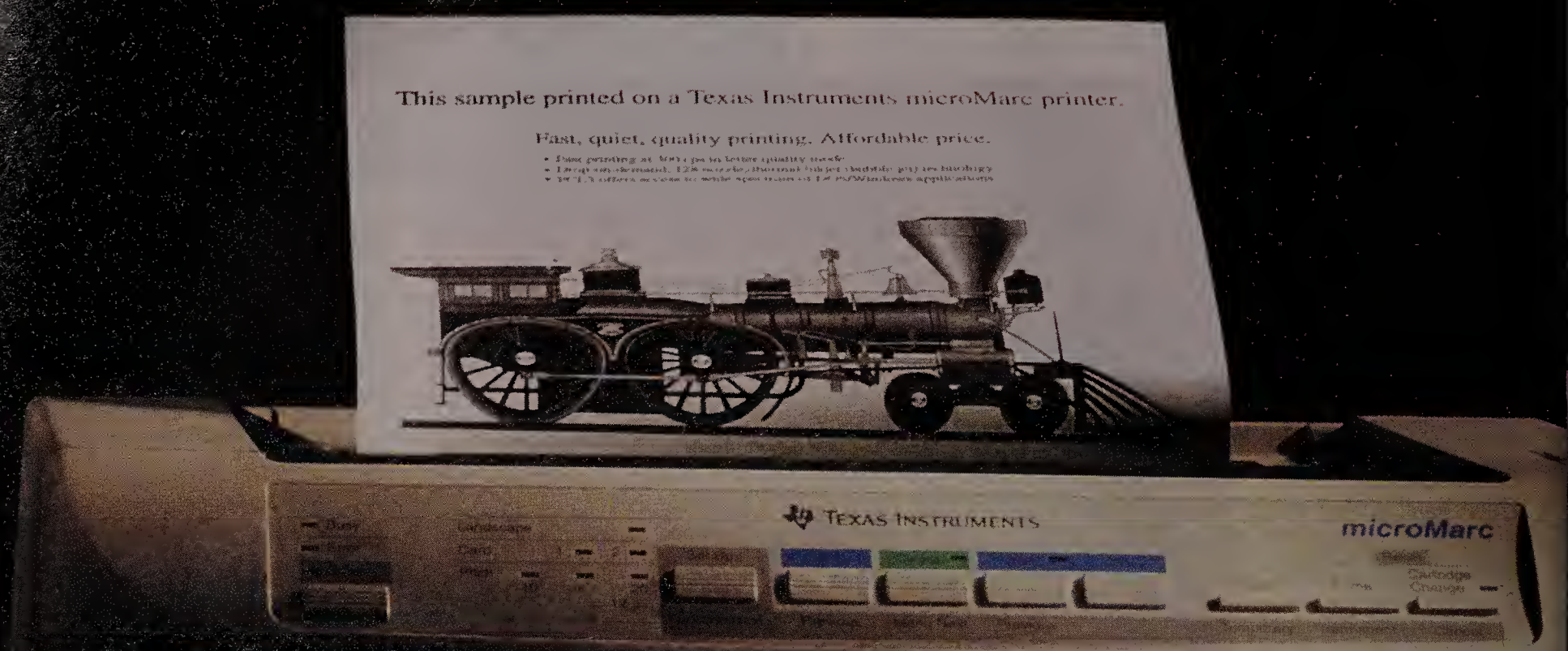
VITAL STATISTICS

Direct price: $1891
Processor: Intel 486DX-33
PROS: Topflight service and support
CONS: Ho-hum performance
Contact: National MicroComputers, 800/424-2983, 801/265-3700 (fax)
Reader service no. 730

While some vendors' interest in the buyer seems to fade once the computer is delivered, National MicroComputers proved to us that its commitment to the new system's owner doesn't stop with the sale. The company performed flawlessly on our anonymous support calls. We were never put on hold, and all our questions were answered promptly, courteously, and correctly. National MicroComputers also gives you a two-year warranty on labor (one year on parts) and delivers on-site service for a reasonable $39 per year. We would like to have seen **continued on page 200**

WE'RE REDEFINING
WHAT YOU
SHOULD EXPECT
FROM
OFFICE PRINTERS.

Speed (ˈspēd) *n.* 1, A feature rarely found in low-cost **inkjet** printers. *example:* In letter quality mode, the **TI microMarc**™ printer gives you laser quality printing at twice the *speed* of the HP DeskJet™ printer.



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If you're looking for a printer with a street price under $300*, you no longer have to settle for poor print quality or painfully slow print speed.

Now, for about the same price as a dot matrix printer, the TI microMarc, with its advanced inkjet technology, will give you the same 300 dpi print quality as most laser printers.

And unlike our biggest competitor, the HP DeskJet, instead of 50 nozzles applying ink to the page, we give you 128 nozzles. Which means that, in letter quality mode, we print text twice as fast. We also give you more memory than they do, for improved graphics. And the benefits don't stop there.

The TI microMarc is also easy to use, thanks to its new hi capacity, easy to replace ink cartridge.

The TI microMarc. It's so quiet, so reliable, so in pensive to run and easy to use, it can help you get more fr your printer than you ever thought possible. At a price y probably never thought possible. For more information o dealer near you, call *1-800-527-3500.*

	TI microMarc	HP DeskJet 5(
Speed (in letter quality mode)	*300cps*	*120cps*
# Of Nozzles	*128*	*50*
Print Quality	*300 dpi*	*300 dpi*
Memory	*24K*	*16K*
Pages/Cartridge	*1400*	*1000*
Weight	*12.1 lbs.*	*14.3 lbs.*

Specifications in chart are based on information as of 9/93. *Estimated dealer price. Dealer prices will vary. microMarc, microWriter and "Extending Your Reach With Innovation" a trademarks of Texas Instruments. DeskJet is a trademark of Hewlett-Packard, Inc. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. © 1993

lexibility (ˌflek·sə·ˈbil·ət·ē) *n.* 1, A feature previously not ound in this category. *example:* For under $800, **TI microWriter**™ rinters give you the *flexibility* to start with **Adobe® PostScript®** r add it later; the comparable HP 4L does not.

THE UNDER $800 PRINTER, REDEFINED.

f you're looking for a printer with a street price well under $800, you'll have a hard time finding one with as many features s a TI microWriter.

Let's compare it to our leading competitor, HP, starting vith basic models. First, take flexibility. Ours lets you add PostScript now or later. With the HP 4L you can't add it at all. Take paper handling. Ours comes with a 250-sheet tray standard, theirs with just a 100-sheet. Speed? We give you 5 ppm, hey give you 4. Yet in spite of all this, we still list for hundreds of dollars less.

Now, let's compare high end models. As you'll see from the chart, the features here are basically comparable – till you get to price. And once again, the TI microWriter is clearly the better value. For more information or a dealer near you, call *1-800-527-3500.*

		TI microWriter Basic	HP 4L	TI microWriter PS23	HP 4ML
Print Speed		*5 ppm*	*4 ppm*	*5 ppm*	*4 ppm*
PostScript		*Upgradeable*	*No*	*Standard*	*Standard*
Paper Trays	*(std.)*	*250 sheet*	*100 sheet*	*250 sheet*	*100 sheet*
	(opt.)	*250 sheet*	*Not Avail.*	*250 sheet*	*Not Avail.*
List Price		*$599*	*$849*	*$799*	*$1279*

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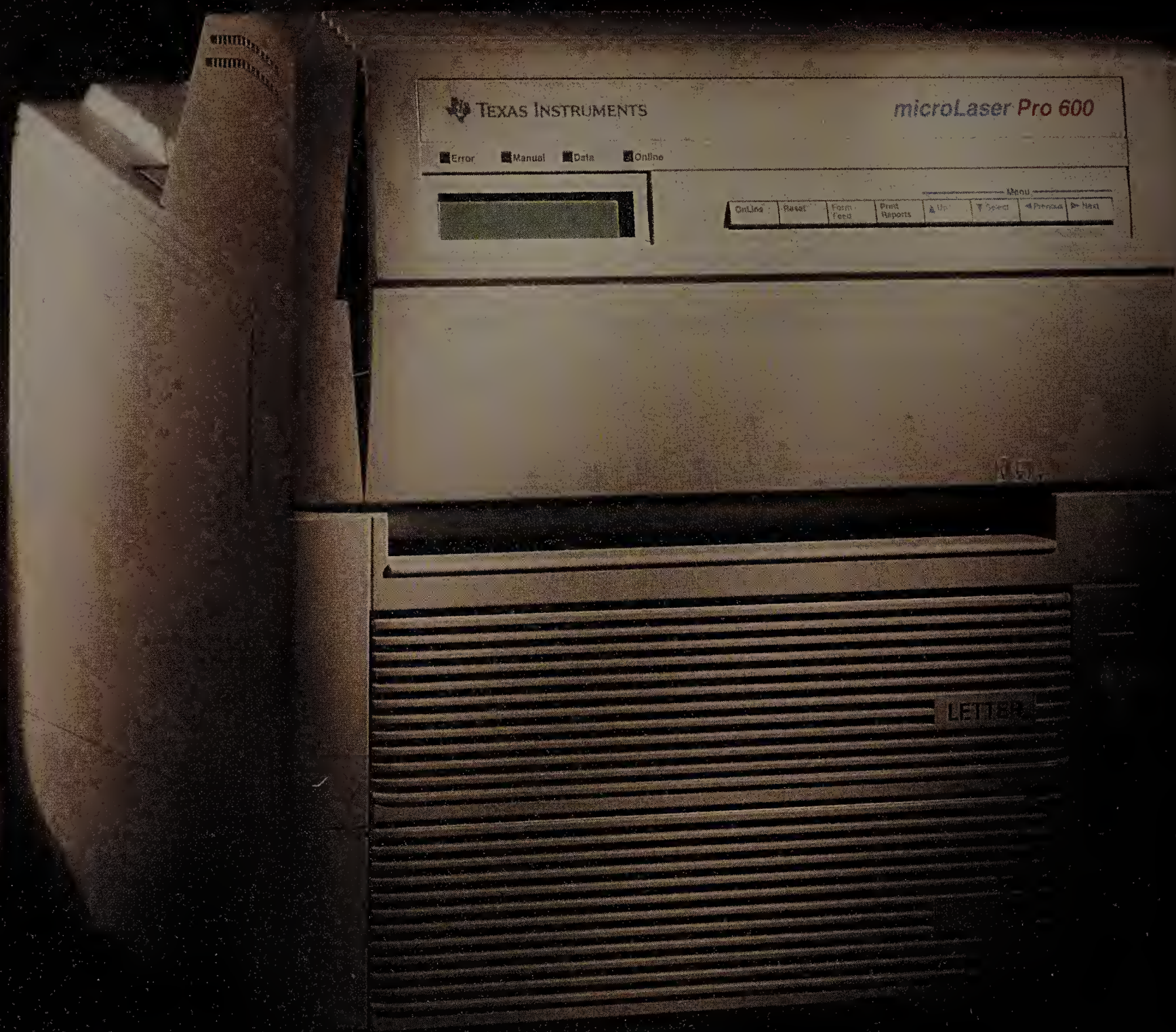
TEXAS INSTRUMENTS

Adobe PostScript

Circle 220 on reader service card

Compatibility (kəm·ˌpat·ə·ˈbil·ət·ē) *n.* 1, A feature typically lacking in this category. *example:* The new **600 dpi TI microLaser™ Pro 600** printer gives you DOS, Windows, Mac®, PCL5 and PostScript® compatibility standard; HP charges hundreds more.



Adobe PostScript

Specifications in chart are based on information as of 9/93. *Estimated dealer price including manufacturer's rebate is under $1400. Dealer prices may vary. † At 4% coverage. ‡Rebate applies to PS23 model. microLaser and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packard, Inc. Mac is a registered trademark of Apple Computer, Inc. © 1993 TI.

The Under $1400 Printer, Redefined.

If you're looking for a true 600 dpi printer with a street price under $1400, you'll have a tough time beating the new TI microLaser Pro 600.

You see, when we set out to design the ideal office printer, we began by asking thousands of users what they wanted most. And then, instead of making those "key care-abouts" optional, as others do, we made them standard.

Take print quality. We began with true 600 dpi resolution. And then enhanced it with 6MB of memory for improved graphics. Compatibility? We're DOS, Windows and Mac compatible right out of the box. With all the right languages and interfaces. And with the intelligence to switch these automatically, depending on the environment. Low maintenance? Our new toner cartridge typically gives you 15,000 pages between changes. Paper handling? Two 250-sheet trays come standard. And finally, value. As the chart below shows, not only do we give you a lot more than our leading competitor, we also charge you a lot less.

So if you're considering a new printer, we invite you to try the new TI microLaser Pro 600. For more information or a dealer near you, call *1-800-527-3500*.

Ask About Our $60 Introductory Rebate.‡

	TI microLaser Pro 600	HP LaserJet® 4	HP LaserJet 4M
True 600 dpi	*Yes*	*Yes*	*Yes*
Speed/Processor	*8ppm/RISC*	*8ppm/RISC*	*8ppm/RISC*
Memory	*6MB*	*2MB*	*6MB*
Emulations	*PCL5/ Adobe® PostScript 2*	*PCL5E*	*PCL5E/ Adobe PostScript 2*
Compatibility	*DOS/Mac*	*DOS*	*DOS/Mac*
Toner Cart. Life	*15K pages*†	*6K pages*	*6K pages*
Paper Trays	*250 sheet/ 250 sheet*	*250 sheet/ 100 sheet*	*250 sheet/ 100 sheet*
Auto Language Switching	*Yes*	*No*	*Yes*
Auto Interface Switching	*Yes*	*Yes*	*Yes*
List Price	*$1599**	*$1759*	*$2399*

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TEXAS INSTRUMENTS

Circle 220 on reader service card

weekend support added to the mix, but that feature is still more the exception than the rule.

The machine that National supports so well is a decent compact desktop, powered by a 486DX-33 and backed by 8MB of RAM out of a possible 32MB and the maximum 256K of secondary cache. Unfortunately, even a good supporting cast can't help a DX-33 to a stellar performance. While it's fast for a DX-33, it lags behind our comparison DX2-66 system by nearly 30 percent.

At least you're not stuck permanently at 33 MHz. National MicroComputers includes a ZIF socket that will accommodate Intel's OverDrive for DX2 chip. RAM upgrades could be costly, however, since you'd have to yank out some of the existing SIMMs to go above 8MB. The system's two VESA local bus slots hold a disk adapter and an STB PowerGraph VL-24 local bus video accelerator. Too bad the monitor that's teamed with that great video board has only a 14-inch screen, but it offers a crisp display nonetheless. The system uses only an ISA bus but has six free 16-bit ISA slots, one of which is partially blocked but could take a half-length card. The others are vacant.

All in all, you get a fair amount of RAM and a decent-size hard drive, but the system stands out in this crowd only for service and support. If you are in the market for a DX-33 and place a premium on support, take a look at the Winstation. Otherwise, turn your sights to the company's 66-MHz offerings.

NCR 3230 Local Bus

VITAL STATISTICS

Direct price: $2310
Processor: Intel 486SX-33
PROS: Exemplary support policies
CONS: Just one free drive bay
Contact: NCR, 800/637-2600, 513/445-5000
Reader service no. 731

What's NCR doing in a review of budget systems? The company, better known for selling high-end systems to corporate buyers at high-end prices, has suddenly jumped into the low end with a machine that carries a direct price of $2310. The NCR 3230 Local Bus, an affordable but eminently respectable system, merits the attention of any value-PC buyer.

One nice thing about buying a value computer from a top vendor: You can take advantage of the same superb team that supports the heavy spenders. In fact, in the service and support category, NCR blows away the rest of the contenders in this review. The 3230 is backed with a three-year warranty, free on-site service, 24-hour toll-free tech support, a 30-day money-back guarantee, and a 3-day turnaround policy for factory repairs. When we called NCR's tech support, we were at times left on hold longer than we like (up to 8 minutes), but the staff answered all our questions knowledgeably.

Another bonus is some surprisingly spirited performance. Of course, the NCR 3230 can't compete with our DX2-66 benchmark system—overall it's about 20 percent slower. But compared with other SX-33s that we've tested, the 3230 is no slouch. Thanks in part to the generous 8MB of RAM and 64K secondary cache, the NCR 3230 is 30 percent faster than the average SX-33, with particularly good performance in Windows.

The compact case makes space for an especially roomy 340MB Western Digital hard disk, connected to an integrated IDE adapter. An integrated Cirrus Logic video chip handles graphics chores; along with the 15-inch NCR monitor, it supports 70-Hz or better refresh rates up to 1024 by 768. A 238-pin ZIF socket will accommodate future OverDrive for DX2 chips. The one thing missing is room for more storage devices—just one externally accessible drive bay is free—but then you don't buy a compact system for expandability. While the 3230 lacked the oomph to push its way onto our Best Buy list, it could be a fine choice for buyers seeking an affordable, well-supported system from a big-name vendor.

NEC PowerMate 466

VITAL STATISTICS

Direct price: $2917
Processor: Intel 486DX2-66
PROS: Top performance, excellent monitor
CONS: Small hard drive
Contact: NEC Technologies, 800/388-8888, 508/264-8000
Reader service no. 732

When we first looked at NEC's PowerMate, we figured we had drafted an all-star. Here was a system with all the pieces in place: a 66-MHz 486DX2 processor, 8MB of RAM, 256K of secondary cache RAM, and a 15-inch NEC 4FGe monitor, one of the best in the business. When we put the PowerMate through its paces, it ran rings around our comparison DX2-66, topping its performance by almost 30 percent. In fact, the NEC was easily the fastest overall system in this month's review, a natural for demanding graphics and business applications.

Unfortunately, you pay a hefty price for this talent. At $2917, the PowerMate is the most expensive system in this review. Even at that price, it has some notable weaknesses. Most serious is the skimpy 170MB hard drive, which would quickly frustrate most serious Windows users. Also cramped is the slimline chassis, which, while easy on valuable desk space, offers just three free ISA slots. While the video circuitry is integrated, the DRAM-based graphics subsystem won't challenge higher-end boards such as the ATI Ultra Pro or Diamond Viper, particularly with the graphics-intensive programs that this system can otherwise run quite capably.

NEC's service and support is mostly excellent. The superb three-year warranty can't be beat, and support reps were courteous and competent. The only drawback here was having to wait awhile on the line before talking to a live human being.

All in all, the NEC PowerMate is a top performer, featuring world-class performance, very good support, and decent design. For those of us operating on a budget, however, this package may be too expensive to sign on.

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Circle 220 on reader service card

Netis N433VL

VITAL STATISTICS

Direct price: $1690
Processor: Intel 486DX-33
PROS: Low price
CONS: Below-average performance
Contact: Netis Technology, 800/577-7526, 408/263-0368
Reader service no. 733

The Netis N433VL is easier on your billfold than most systems here. And if you outgrow its DX33 power, the compact desktop offers outstanding expansion possibilities. The ZIF socket lets you boost speed by swapping in Intel's 66-MHz OverDrive chip, and the five accessible drive bays and five free slots—one VL bus, two 16-bit, and two 8-bit—let you pile on the peripherals. You can also plug in enough memory to run Windows NT and other RAM-intensive programs. Though you might need to pull 1MB SIMMs to make room for the higher-capacity 4MB memory modules, you can expand RAM to a robust 32MB. As it is, the Netis N433VL comes decently stocked with a capacious 250MB Conner hard drive, 8MB of RAM, a Genoa 32-bit local bus card with 1MB DRAM, and a 14-inch monitor.

Netis's service and support won't knock your socks off, but it's solid. The system comes with a one-year warranty and 10 hours of toll-free technical support weekdays and Saturdays. Netis also offers on-site service for $75 a year. Our anonymous calls for help were picked up immediately, and advice was excellent, aside from one offtrack answer.

In short, Netis's respectable support and attractive price and expandability place it solidly in the upper half of the systems reviewed. Only uncompetitive performance kept us from giving the N433VL our top recommendation.

Polywell Poly 4586VR

VITAL STATISTICS

Direct price: $2500
Processor: Intel 486DX2-66
PROS: Terrific performance, lots of room for expansion
CONS: None
Contact: Polywell Computers, 800/999-1278, 415/583-7222
Reader service no. 734

Gourmet chefs know that in order to prepare a cordon bleu meal, you must use the finest ingredients. Polywell took the same approach when it put together its latest masterpiece. Every aspect of the Poly 4586VR is superb. The company has blended truly hot performance with ample expandability and responsive support. Careful attention to every detail earns the Poly 4586VR our version of the blue ribbon—a *PC World* Best Buy.

The Poly cruised to within a few percentage points of our fastest system, the NEC PowerMate. It easily outpaced our comparison DX2-66 system, recording its strongest scores on the Freelance Graphics and Paradox tests. The 8MB of RAM, 256K of secondary cache, and local bus hard disk caching controller all contribute to its success. Other quality ingredients include a local bus Orchid Fahrenheit 1280 Plus VLB video card and an impressive 340MB hard drive from Western Digital.

The Poly 4586VR won't give you that stuffed feeling, either. You'd be hard-pressed to find a way to fill all five of this tower's free drive bays, three externally accessible and two internal. To top it off, you'll find a vacant local bus slot and five free 16-bit slots. The fan atop the CPU partially obstructs two of the 16-bit slots, but you still have three to spare for full-length cards. You can also pile up to 64MB of RAM into the Poly, one of the highest ceilings available on PCs, though you'd have to remove existing 1MB SIMM cards to bring RAM above 8MB. A 238-pin ZIF socket promises future CPU upgradability.

Even service and support is above average. The technicians answered all our calls correctly and relatively quickly, and Saturday telephone support is a plus. Polywell supplements its one-year standard parts warranty with five years of free labor and a 30-day money-back guarantee. The monitor, hard drive, and graphics card are covered for two years.

The Poly 4586VR's least impressive feature is its $2500 price tag, but even that ingredient is palatable. So if you want a fast value machine with lots of room to grow, this Polywell Best Buy is the pièce de résistance.

Quill Qtech VL-4334

VITAL STATISTICS

Direct price: $1999
Processor: Intel 486DX-33
PROS: Lots of expansion, 15-inch multisync monitor
CONS: Limited service, sluggish performance
Contact: Quill Corp., 708/634-6650
Reader service no. 735

In such a supercharged crowd, "fast" isn't always enough to lead the pack—machines that are very fast in their own right are still going to get left behind. This 486DX-33 system's performance is unremarkable, despite its 8MB of RAM, 256K of secondary cache, and local bus video and disk adapter. In our Excel and WinWord benchmarks, the Qtech was outpaced by comparable DX-33s configured with only 4MB of RAM.

This system's terrific expandability will turn a few heads. The Qtech's VESA local bus–equipped motherboard comes with a ZIF processor socket to accommodate Intel's current DX2-66 as well as the long-promised OverDrive for DX2, and you can add 64MB of

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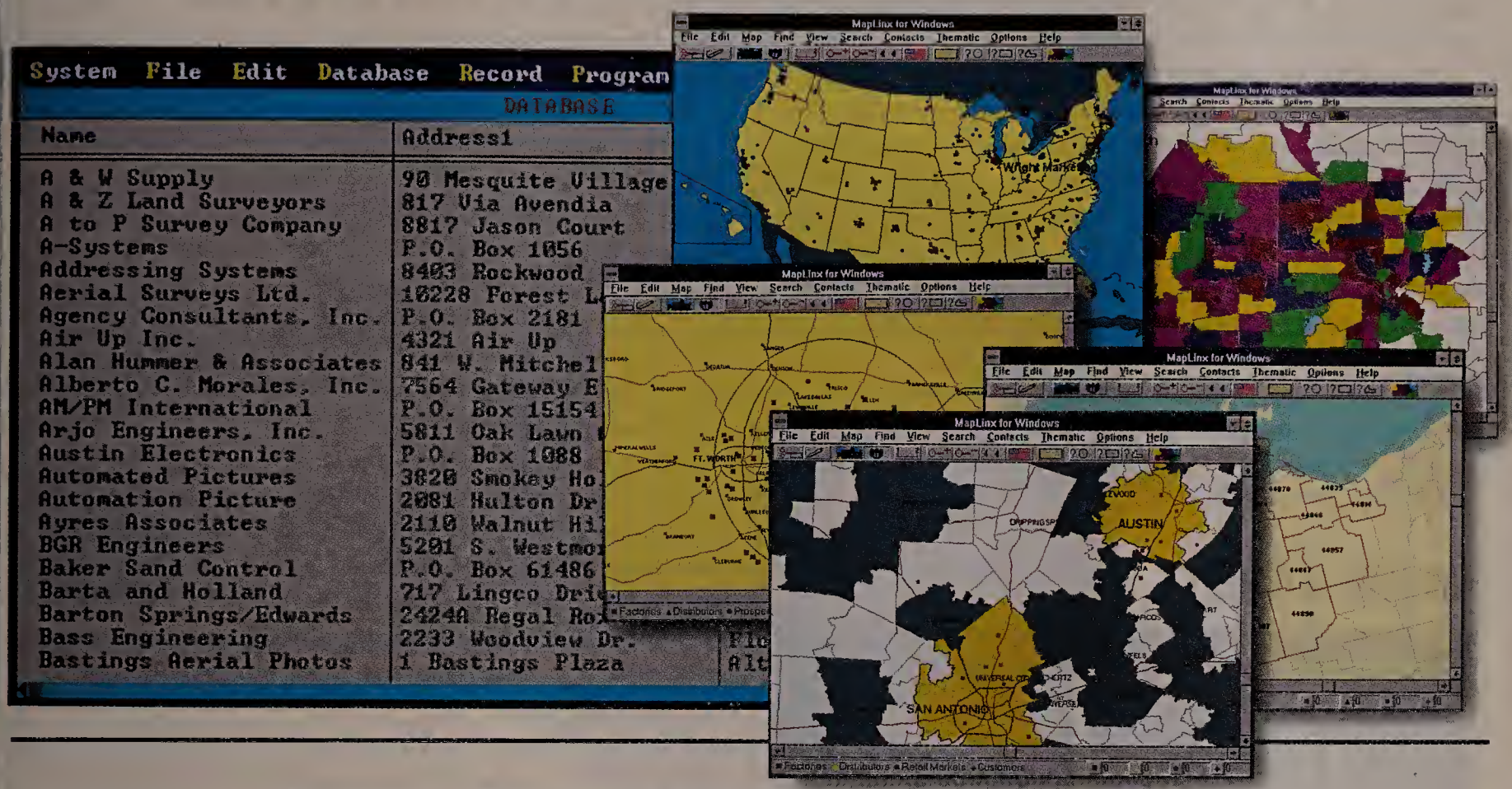

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InfoWorld, 3/15/93

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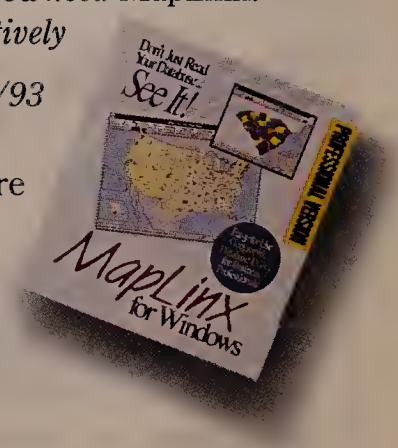

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System Requirements: IBM AT, PS/2 or 100% compatibles; Microsoft Windows® 3.0 or higher; DOS 3.3 or higher; 2 Mb RAM; EGA, VGA, XGA or SVGA video card; Microsoft® or compatible mouse.

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RAM, more than enough for nearly any business user. The motherboard and compact desktop case offer an astounding number of available drive bays (three) and expansion slots (five 16-bit ISA). The Qtech is a strong candidate for a complete office PC. Its spacious chassis has plenty of room available for CD ROM drives, sound cards, and scanners. To top it off, the 15-inch edge-to-edge flat-screen monitor makes the most arduous Windows sessions easy on the eyes, even at super-VGA resolutions.

Unfortunately, Quill needs to spruce up service and support to sustain our interest. Service is courteous but uneven—one of our anonymous questions completely stymied the technicians. Support requires a toll call, and it's available only on weekdays, 10 hours a day. Furthermore, Quill warranties its systems for one year—rapidly becoming the minimum among vendors. It's one of the handful of system vendors represented here that don't guarantee a maximum turnaround time on repairs. On-site service is contracted through Memorex-Telex.

In short, Quill's offering shows promising expandability and comes with a pretty snazzy monitor. However, the system needs more punch for the money and much-improved support policies before it can become a standout.

Tangent M440VL

VITAL STATISTICS

Direct price: $1595
Processor: Cyrix Cx486S-40
PROS: Fine price and service
CONS: Uncompetitive performance
Contact: Tangent Computer, 800/800-5550, 415/342-9380 (fax)
Reader service no. 736

At $1595, Tangent's candidate—the M440VL—will pique the interest of the budget-conscious. What makes this system even more intriguing is its above-average service and support and decent expandability, all in a computer that can perform well as a basic office system.

Like many solid systems these days, the Tangent M440VL allows ample RAM expansion (up to 32MB) and comes with 256K of secondary cache upgradable to an impressive 1MB. This PC also has a 238-pin ZIF socket, in case you're holding out for compatibility with one of Intel's next-generation upgrades. Tangent even went the extra mile by placing the CPU socket in the sparsely populated left-front corner of the motherboard, leaving plenty of room for adding a fan-cooled heat sink (it is widely rumored that the coming CPUs are going to run very hot). While both of the VL bus slots are filled (with a drive card and graphics accelerator), the five free 16-bit slots and three free drive bays give you adequate room to add peripherals.

A closer look, however, reveals a couple of major flaws. First, while Tangent is usually attentive to fine points, we were surprised to find that the motherboard is unsupported under the cache chips and CPU. The ZIF socket makes for pressure-free CPU swaps, but if you decide to upgrade the secondary cache, you'll need to pull and replace cache chips—possibly buckling and damaging the motherboard in the process.

The Tangent system really falters, however, in its performance. This PC is like a Miata among Maseratis—perky but hopelessly outclassed by the DX2-66s. The performance of the economy Cyrix Cx486S-40 FasCache falls somewhere between Intel's 486SX-25 and DX-33 processors. In the DOS-heavy BAPCo SYSmark92 tests, the Tangent M440VL's results were comparable to those of an average DX-33, but its times in the Excel and Word for Windows tests were relatively slow. Its meager 4MB of RAM—the bare minimum for a Windows box—doesn't help matters. It's no surprise that the Tangent M440VL's performance brings up the rear in this pack of speed demons.

We were pleased with the toll-free support, available 11 hours on weekdays and 7 hours on Saturday, as well as with the year of free on-site service. Responsiveness varied a bit, but technical support furnished accurate answers.

The Tangent M440VL is a reasonably upgradable and inexpensive machine, but it suffers from slow performance. If low-cost computing combined with power is the name of your game, check out the Eltech Splendor III system, which offers considerably greater power for just a few hundred dollars more. But if price alone is a primary consideration, look at this machine or possibly one of its stablemates in the Tangent line.

System Snapshots

These systems, while very capable, don't match the preceding group for overall value in a business environment. However, many of them present unique and valuable solutions to end-user needs.

Atronics ATI 486DX/33 Multi VL

DIRECT PRICE: $2672 **PROCESSOR:** Intel 486DX-33 **PROS:** CD ROM drive, sound card **CONS:** High price, relatively slow **CONTACT:** Atronics Int'l, 800/488-7776, 510/656-8400 **Reader service no. 737**

The Atronics is one of only two systems here with a CD ROM drive. And while it can't keep up with our comparison DX2-66 system, it's slightly faster than the average DX-33. Atronics backs the box with reasonably good service and support: You get 3-day turnaround on depot repairs, a 30-day money-back guarantee, and a one-year warranty. On-site service is $69 for the first year.

Unfortunately, the system's expandability is limited. While there are four ISA slots open, there's no 238-pin socket for the expected next-generation OverDrive for DX2 chips. The graphics controller and the IDE card fill both VL bus slots. Also the system's CTX monitor is limited to a flickery 60-Hz vertical refresh rate. In a review where price/performance really matters, this DX-33 system costs more than most of the DX2-66s, putting it well out of the running despite its CD ROM drive, sound card, and comprehensive software bundle.

Compaq Presario 425

STREET PRICE: $1539 **PROCESSOR:** Intel 486SX-25 **PROS:** Low price, great service, communications, and software bundle **CONS:** Slow performance, very limited expandability **CONTACT:** Compaq Computer, 800/345-1518, 713/378-8820 **Reader service no. 738**

Meet the Presario **continued on page 208**

There's An Easier Way To Expand Your Memory

If you've been struggling to get the most out of your PC's memory, there's an easier way. It's called NETROOM® — the award winning memory manager that uses the newest technologies to shatter memory barriers, giving you more memory and a faster system.

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And since Cloaking operates in your computer's protected mode, it's ultra-reliable and virtually eliminates crashes.

Cloaking will also upgrade all your BIOSs to the latest, most powerful versions including ISA, EISA, VL-Bus, VGA, PS/2 Micro Channel and Laptop/APM, so it will enhance any 386/486/Pentium™ system.

And, our Cloaked BIOS includes built-in virus protection so you can relax, secure in the knowledge that your data is safe.

CRASH-PROOF

Despite its obvious power and versatility, you don't have to be an engineer to install NETROOM. In fact the installation procedure is so simple it's literally crash-proof!

All you do is type in one command and choose your level of customization – *Conservative* for basic memory management, *Aggressive* for optimal management, and for those of us who have to have it OUR way, there's even a *Custom* mode available.

No matter which you choose, NETROOM will automatically take over from there and create the optimal memory configuration for maximum performance whether you're working in Windows or DOS.

And, our *Customize* program will automatically continue the customization process even if you "warm boot" or turn off your system in the middle.

In short, NETROOM isn't only crash-proof, it's also goof-proof!

SCOREBOARD

Comparing memory managers	Helix Software Netroom 3.02	Qualitas Inc. 386Max 7.0	Quarterdeck Office Systems QEMM 7.01
PCWEEKLABS Overall score	4.5	3.6	4.0
Ability to reclaim memory below 1M byte (80%)	4.5	3.5	4.0
Ease of setup and configuration (25%)	4.0	3.5	3.5
Variety of memory APIs (15%)	5.0	4.0	4.5

Ratings Legend: 1 = Poor; 2 = Unremarkable; 3 = Meets Expectations; 4 = Better Than Expected; 5 = Outstanding

PC WEEK – July 26, 1993

SOME PRETTY SHARP TOOLS

As if having NETROOM wasn't handy enough, we've also included with it a full range of utility programs like our own Disk Cache which is faster than DOS's SmartDrive but uses only 5K; a graphical Windows and DOS screen saver, and an accelerator which speeds up DOS text screens by up to 20X!

Combine that with our ultra fast RAM drive, virus protection and the fact that *all* these utilities run in our exclusive Cloaked mode and you can see why NETROOM is the sharpest choice in memory managers!

DISCOVER™

Our DISCOVER system analysis program, with its easy-to-use graphical interface, gives you access to a complete report of your DOS and Windows environments including benchmarking, on-line help and even the ability to edit system and batch files.

SOME TECHNICALITIES...

NETROOM also provides all these special features:

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- Relocates SHELL and Stacks
- Manages self-loading TSRs
- Network Remote installation
- Special network loaders
- Support for DOS 6 Multi-config
- Support for all disk compression
- ROM "hole" scan
- Stack overflow protection
- Frame extender for larger TSRs
- Supports up to 256Mb of RAM
- Shadowing and De-Shadowing
- Network adapter detection
- Flexible multi-user licensing

If you're ready to expand your memory *and* performance without expanding your budget, the only thing you should be pumping into your computer is NETROOM!

SYSTEM REQUIREMENTS: Netroom operates with any 386 or 486 system with at least 1Mb of RAM. Limited support for 286/Neat systems is provided but does not include "Cloaking". For Windows support Netroom requires Windows 3.1 or later (WFW is supported). Microsoft Windows is a trademark of Microsoft Corp.

> *"NETROOM is the tops among memory managers"*
> — PC WEEK, PC WEEK LABS
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Imagine a notebook that adjusts to the way you work instead of the other way around. The keyboard detaches when that's more convenient. You can use the pen as a pointing device, to highlight or delete text, or to take notes (you know, like a pen). And unlike "convertible" notebooks, you can comfortably use both the keyboard and pen at the same time.

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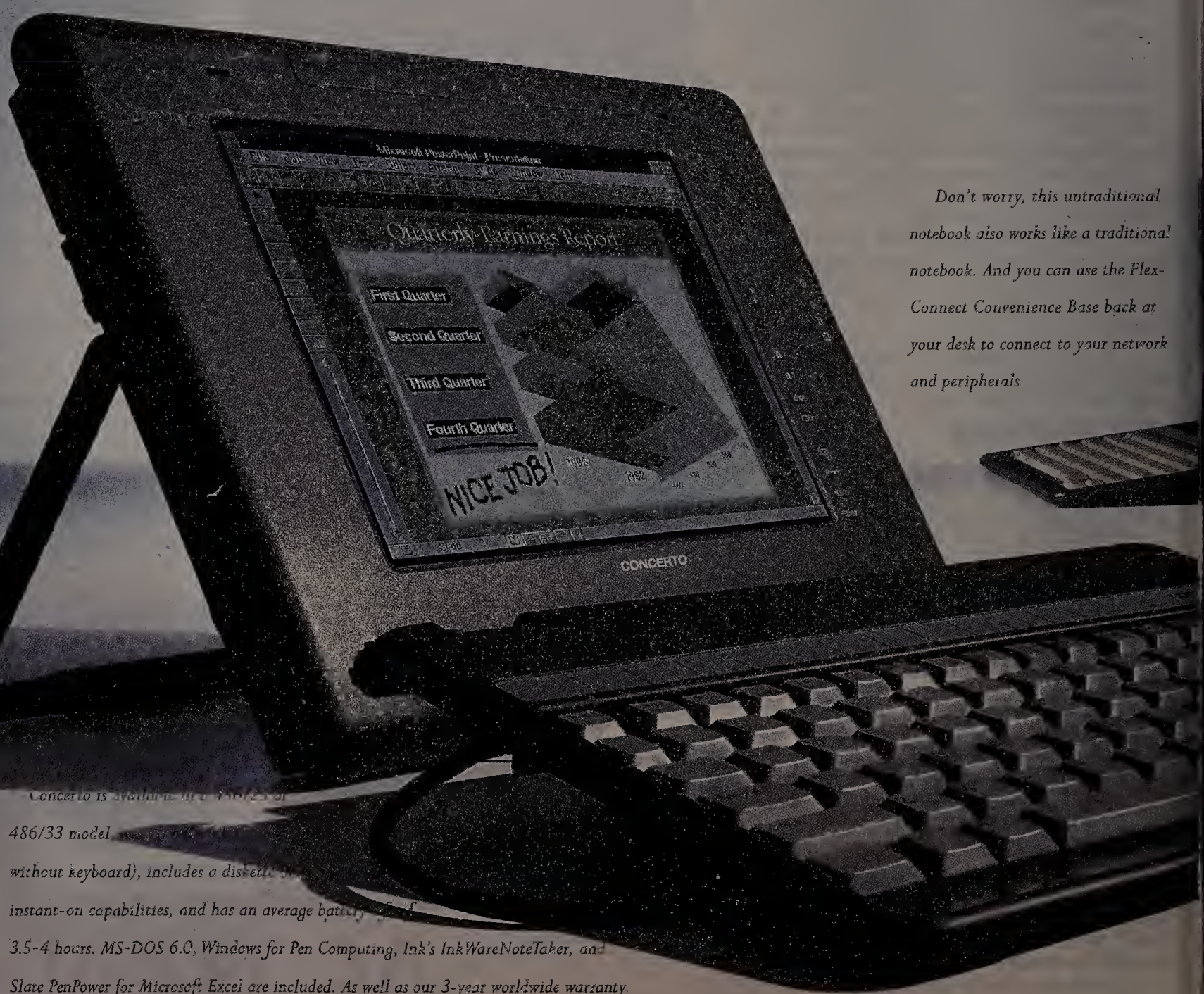
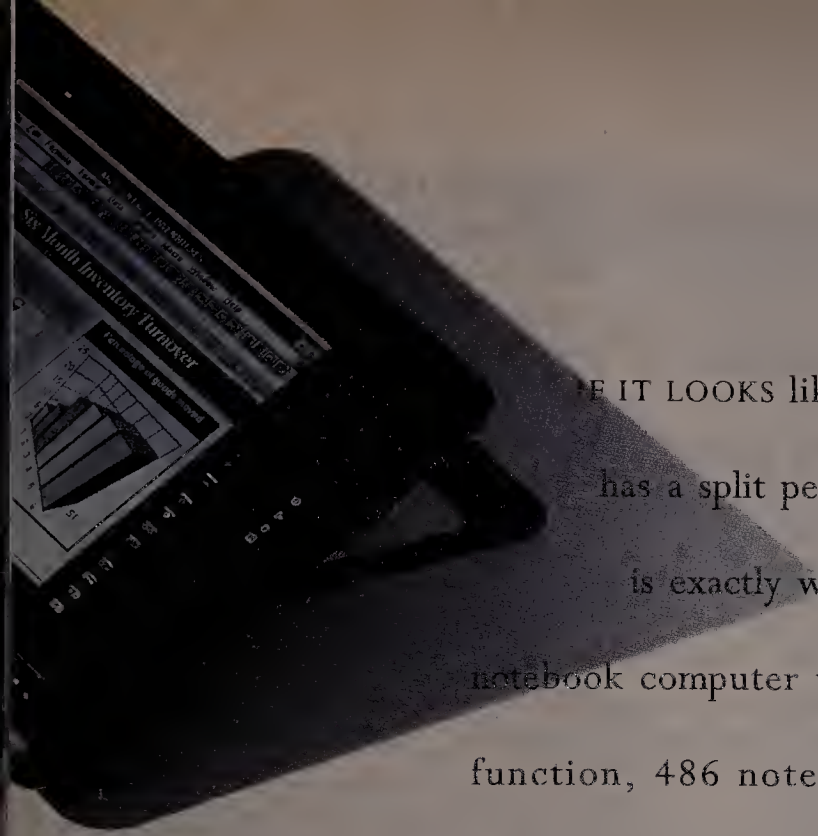
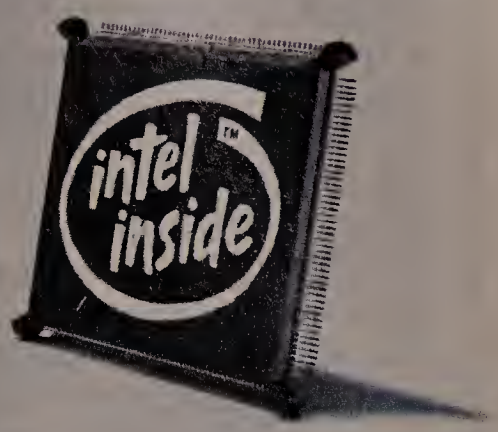


Don't worry, this untraditional notebook also works like a traditional notebook. And you can use the Flex-Connect Convenience Base back at your desk to connect to your network and peripherals.

Concerto is available in a 486/25 or 486/33 model [illegible] without keyboard), includes a diskette [illegible] instant-on capabilities, and has an average battery life of 3.5-4 hours. MS-DOS 6.0, Windows for Pen Computing, Ink's InkWareNoteTaker, and Slate PenPower for Microsoft Excel are included. As well as our 3-year worldwide warranty.

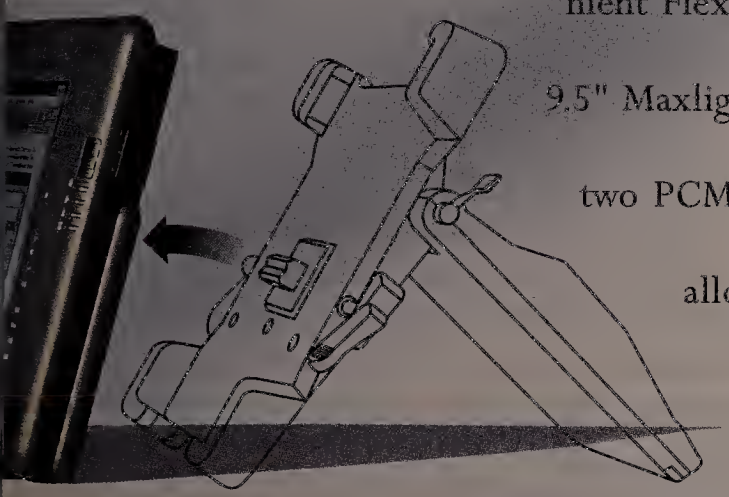


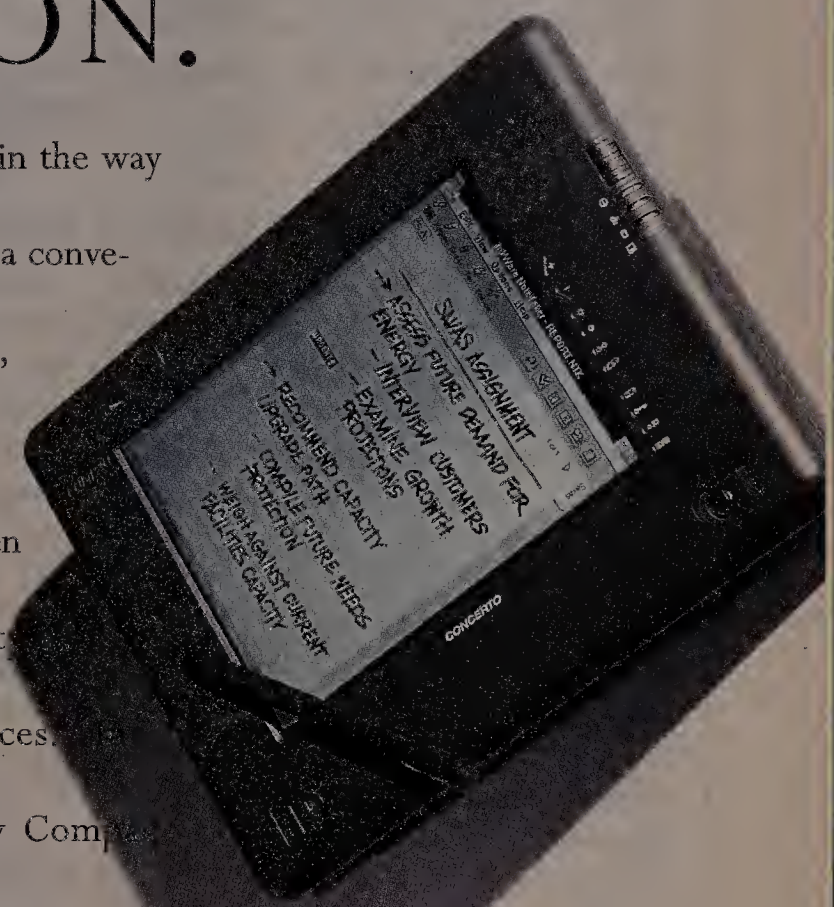
IF IT LOOKS like the new Compaq Concerto has a split personality, well, it does. Which is exactly what makes it the most useful notebook computer we've ever built. It's a full-function, 486 notebook with pen capability.



ONAL NOTEBOOK WITH D FOR TRADITION.

The keyboard detaches so it's as flexible in the way it works as you have to be. It comes with a convenient Flexhandle, a high-definition, 9.5" Maxlight display and with the two PCMCIA Type II slots, it even allows you to add a variet industry-standard devices. In other words, the new Comp Concerto works in an incredible number of ways. Which, come to think of it, is probably a lot like the way you work, isn't it? For more details on the new Compaq Concerto just call 1-800-345-1518.





The perfect solution for meetings. Just bring the tablet and pen and you can quietly take notes, access files, work on budgets. (Or, should the meeting get really slow, you can pursue an art career.)

COMPAQ

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425—Compaq's antidote to Mac envy. This PC, aimed at the home user, comes with everything. It meets the requirements of the EPA's Energy Star Computers program and includes a slew of start-up software optimized for beginners, a built-in fax-modem, and voice mail. Compaq's new interface, Tabworks, is particularly impressive. And it's hard to beat Compaq's three-year warranty, year of free on-site service, and 24-hour toll-free tech line—although we did wait on hold longer than usual and got one incorrect answer.

For business and power users, however, the Presario stumbles in several key areas. Expandability is very limited, with only two ⅔-length slots and no free drive bays. Even worse, most businesses will find it short on performance—quicker than most 486SX-25s but not half as fast as our comparison 486DX2-66. This friendly little box is sure to find its way home with many PC first-timers, but we can't recommend it for your office desktop.

DTK Grafika-4V2D-S2

STREET PRICE: $1725 **PROCESSOR:** Intel 486SX-25 **PROS:** Low price **CONS:** Poor performance, no 30-day money-back guarantee **CONTACT:** DTK Computer, 818/810-8880 **Reader service no. 739**

DTK's entry offers a lot of computer system for the dollar. While some of the Grafika-4V2D-S2's components are lower-end, such as the smallish 170MB hard drive and 14-inch monitor, others, such as the local bus graphics adapter and hard drive adapter cards, are surprisingly advanced. Furthermore, DTK provides decent service and support. The technicians answered our calls promptly and mostly accurately. You also have plenty of space to upgrade—the Grafika system's roomy desktop case has four free slots and three free externally accessible drive bays, in addition to a processor upgrade socket so you can take it up to a DX2-66 in the future.

However, while the Grafika shines on price, it pales on performance. Due in large part to its 8MB of RAM, the 486SX-25 outpaced its peers by 15 percent. Our comparison DX2-66 system, however, leaves this Grafika in its dust, as do most other systems here. If you're longing for a low-cost business-class PC, you'll find a number of considerably faster units here, such as the Eltech and the Netis, for at most a couple of hundred dollars more.

Gateway 4DX-33

DIRECT PRICE: $1895 **PROCESSOR:** Intel 486DX-33 **PROS:** Good design **CONS:** Hard to get through to service and support **CONTACT:** Gateway 2000, 800/846-2000, 605/232-2000 **Reader service no. 740**

Gateway's system looks attractive and performs very well for a DX-33, thanks to its 8MB of RAM, fast hard drive, 128K of secondary cache, and local bus video adapter. However, the company, a legend among vendors of low-cost systems, sent us a fully loaded 486DX-33 priced more like a 486DX2-66. In addition, Gateway still suffers from problems meeting the load on its support lines. We got through only once with our calls, and that after an 11-minute hold. Once you're in, however, Gateway's service and support is solid.

We found only a couple of drawbacks in the system's design. You'll need to take out 4MB of RAM before upgrading further, and the desktop case has only one free externally accessible drive bay. Our main objection is that these days buyers can find a system with more pluck for their buck.

Hewlett-Packard Vectra 486/33VL Model 240

STREET PRICE: $2316 **PROCESSOR:** Intel 486DX-33 **PROS:** Three-year warranty **CONS:** Comparatively underpowered, limited expandability, no toll-free tech support **CONTACT:** Hewlett-Packard, 800/752-0900 **Reader service no. 741**

The well-designed Vectra unfortunately isn't ready to compete down here at the low end. HP charges a premium for performance, and while this pricey system is 14 percent faster than the average DX-33, it's about about 40 percent slower than our DX2-66 comparison system. And like Gateway's system, it is priced high for a DX-33. Expandability could be better. The CPU sits in a regular 486 socket—it won't take an OverDrive for DX2. Of the three 5¼-inch drive bays, only one is available. One positive note: All four ISA slots are free.

We were most surprised by HP's service and support. While its three-year warranty and year of free on-site service are what we expect from this premier vendor, tech support requires a toll call and is unavailable on weekends. Moreover, we sat on hold for 20 minutes to reach a technician. Finally, support is free for three years rather than the life of the system. This doesn't match the policies of other major vendors. We advise you to look at one of our Best Buys instead.

Packard Bell PB 486SX/33

STREET PRICE: $1448 **PROCESSOR:** Intel 486SX-33 **PROS:** Low price **CONS:** Very slow in Windows, substandard monitor **CONTACT:** Packard Bell Electronics, 818/886-9998 **Reader service no. 742**

Packard Bell, one of the more enduring mass merchants, bundles a number of goodies with its PB 486SX/33 system. In addition to Microsoft's Works for Windows and Money for Windows, you get the Packard Bell Navigator, a software front end that makes using Windows and Prodigy a real no-brainer. Packard Bell backs the box with good service and support, too. Even though the one-year warranty is the least we expect, the company's free on-site service and 24-hour toll-free technical support are above average. While we had to wait on hold for up to 11 minutes, the technicians we spoke to answered our questions well.

Unfortunately, the system lacks some features we think are essential for serious business use. It comes without any secondary cache (you can add up to 512K on your own). The 14-inch monitor delivers only a flickery 60-Hz refresh rate, even at 640 by 480 resolution. But the system's most serious deficiency is performance: It recorded substandard scores in every segment of our Windows test. Unless you're looking for an inexpensive home machine, we'd advise you to look at one of our Best Buys instead.

Tandy 3100

DIRECT PRICE: $1699 **PROCESSOR:** Intel 486SX-33 **PROS:** Inexpensive, small **CONS:** Slow, poor monitor **CONTACT:** Tandy, 817/390-3011 **Reader service no. 743**

The Tandy 3100 features some nice touches, including a Sound Blaster sound card, a roomy 212MB hard disk, and a convenient motherboard design in a compact slimline chassis. And at a price of $1699, it's one of the least expensive PCs in this review.

Unfortunately, the Tandy 3100's slow performance and very poor display make it inappropriate for Windows and graphics applications. And this 486SX-33–based PC, hamstrung by an inadequate 4MB of RAM and the lack of any secondary cache, not only trails our average DX2-66 system by more than 1½ times, it also falls behind sibling DX-33 and SX-33 systems. The 14-inch monitor's .39mm dot pitch produces mushy graphics. Internal expansion is also a problem, with only a pair of ISA slots and two drive bays open for peripherals. You can get a lot more for your money.

Last Year's Power PCs Become Affordable

	Word for Windows 2.0	Excel 4.0	Paradox 3.5 in DOS window	Freelance for Windows 1.0	BAPCo SYSmark92
NEC PowerMate 466	1:36	1:18	1:53	1:43	170
Polywell Poly 4586VR*	1:39	1:19	1:42	1:46	152
Everex Step VL EISA DX2/66	1:37	1:18	2:20	2:00	187
MIS Promis SL-66*	1:41	1:26	2:02	1:45	161
Axik Ace Cache 486DX2-66V*	1:46	1:37	2:05	1:52	165
AST Bravo LC 4/66d Model 213W	1:45	1:33	2:25	2:06	138
Ambra D466BL*	1:53	1:39	2:19	2:11	139
MicroSource Tempest 486VLB-66	1:51	1:41	2:55	2:19	141
Eltech Splendor III*	2:00	1:41	2:29	2:09	127
Comtrade EISA VLB 486DX2/66	1:57	2:02	2:31	3:07	154
Insight 486DX2-66 VL	2:02	1:57	2:33	2:30	122
Acer Acros 486DX2/66	2:09	2:11	3:22	2:32	145
NCR 3230 Local Bus	2:33	2:08	1:53	2:46	113
Gateway 4DX-33	2:20	1:59	3:00	2:38	110
CompuAdd C433S Low Profile	2:21	2:13	3:14	2:46	114
Nat'l MicroComputers VL Winstation	2:27	2:14	2:53	2:45	106
Netis N433VL	2:42	2:13	2:53	2:59	108
Micro Express MicroFlex-VL/S	2:31	2:18	2:52	3:17	111
Hewlett-Packard Vectra 486/33VL	2:56	2:13	2:53	2:54	101
Logisys L-Windows 486DX/33	2:40	2:16	3:48	2:54	99
Quill Qtech VL-4334	3:02	2:24	3:33	3:04	102
Blackship BLK 486DX/33 LB	3:08	2:36	3:34	3:38	111
Atronics ATI 486DX/33 Multi VL	3:13	2:34	3:34	3:26	91
Diamond DT 486C-40 VL	3:20	3:05	3:35	3:56	108
Tandy 3100	3:19	2:58	4:05	3:34	102
Tangent M440VL	2:53	2:52	4:08	4:41	109
DTK Grafika-4V2D-S2	3:30	2:54	3:58	3:36	87
Compaq Presario 425	4:06	3:16	4:32	4:04	79
Packard Bell PB 486SX/33	3:40	3:46	6:49	4:05	87

*Best Buy

Systems are arranged in order of overall speed, from fastest at top to slowest at bottom. Test results are in minutes:seconds except for the BAPCo results, which are given in number of scripts executed per hour.

Methodology

Tests were run on systems with 4MB or more RAM and either DOS 5.0 or DOS 6.0. If we installed Windows, we chose the default installation. We configured Windows with an HP LaserJet III, disabled Print Manager, and attached a null printer to LPT1. Using vendor-supplied video drivers, we set the resolution to 800 by 600 pixels with 16 colors. On systems unable to support 16 colors, we used 256.

Word for Windows 2.0 We use the spelling checker and scroll through a 27-page document; create, format, print, and save a single-page business letter; and open a business proposal, add a paragraph, then preview and print it.

Excel 4.0 We perform several data extracts; build and format a financial statement and print it; and open a mortgage analysis, scroll, move blocks, change the interest rate, print-preview the statement, and save it.

Paradox 3.5 in DOS window We perform a variety of data entry, record searching, and updating tasks. Then we generate reports against a simple customer list.

Freelance for Windows 1.0 We load a single-page starter file containing a U.S. map with each state as a separate object. Then we enter preformatted text on the page in preset headings, add a second page, and enter text as bulleted items. We add three more pages, each containing a single 3-D bar chart, and import data from a WK1 file. Next we add a sixth page containing four 3-D pie charts and preview a slide show. We apply various views to the presentation and preview the slide show four more times, with various effects. Finally we save the presentation to disk.

BAPCo SYSmark92 We run a scripting program that loads PageMaker 4.0, dBASE IV 1.1, Harvard Graphics 3.0, 1-2-3 3.1, Microsoft C 6.0, Excel 3.0, Word for Windows 2.0, Paradox 3.5, Quattro Pro 3.0, and WordPerfect 5.1 and executes a variety of typical tasks with each.

Testing performed by Susan Silvius and Ulrike Diehlmann. Data based on tests designed and conducted by the PC World Test Center except the BAPCo SYSmark92, an industry standard test designed by the Business Application Performance Corporation. **All rights reserved.**

FEATURES COMPARISON

Power Systems at Value Prices

● Yes
○ No
n/a = not applicable

	Acer Acros 486DX2/66	BEST BUY Ambra D466BL	AST Bravo LC 4/66d Model 213W	Atronics ATI 486DX/33 Multi VL	BEST BUY Axik Ace Cache 486DX2-66V	Blackship BLK 486DX/33 LB	Compaq Presario 425	CompuAdd C433S Low Profile	Comtrade EISA VLB 486DX2/66
Standard features									
Selling price as of 9/1/93	$2299	$1979	$2479	$2672[1]	$2198	$1595	$1539	$1864	$1999
CPU	i486DX2-66	IBM Blue Lightning	i486DX2-66	i486DX-33	i486DX2-66	i486DX-33	i486SX-25	i486SX-33	i486DX2-66
BIOS	Acer	Phoenix	AST LC II	AMI	AMI	AMI	Compaq	Phoenix	AMI
Installed/maximum RAM (MB)	4/36	8/64	8/64	8/32	8/32	4/64	8/20	8/64	4/128
Secondary cache installed/maximum (K)	256/256	256/256	64/256	128/256	256/256	128/1024	0/0	256/256	256/256
Hard disk	Conner CP30254	Maxtor IDE	Maxtor 7213AT	Conner AP90078	Quantum Pro-Drive PS 240AT	Quantum ProDrive LPS	Seagate ST3243A	Western Digital Caviar 1210	Western Digital Caviar 2340
Size (MB)	250	240	210	212	245	240	200	210	340
Adapter	integrated	integrated	integrated	expansion card	expansion card	expansion card	integrated	integrated	expansion card
Floppy drives (MB)	1.2, 1.44	1.44	1.44	1.2, 1.44	1.2, 1.44	combo	1.44	1.44	1.2, 1.44
Graphics adapter	n/a	32-bit VLB	n/a	32-bit VLB	32-bit VLB	32-bit VLB	n/a	n/a	32-bit VLB
Vendor and model	n/a	ATI VLB Mach 32	n/a	Genoa Windows VGA 24+	Diamond Stealth 24VLB	Color Designer A3	n/a	n/a	STB Power-Graph VL-24
Video processor	Cirrus Logic	ATI Mach 32	Cirrus Logic	Cirrus Logic	S3	Cirrus Logic	Cirrus Logic	ATI Mach 32	S3
Installed memory	1MB DRAM	2MB VRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM	1MB DRAM
Monitor	Acer AcerView 56L	Ambra	AST SVGA-LR	CTX CVP-5468NI	ADI Micro-Scan 3G	KFC	integrated	CompuAdd SuperVGA	CTX CMS 1461
Screen diagonal (inches)	15	14	15	14	14	14	14	14	14
Fax-modem	internal	○	○	○	○	○	internal	○	○
Fax/data speed (bps)	9600/1200	n/a	n/a	n/a	n/a	n/a	9600/2400	n/a	n/a
Sound board	○	○	○	●	○	○	○	○	○
Expandability									
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/1/0	0/4/0	0/4/0	0/3/1	0/5/0	0/3/2	0/2/0	0/5/0	4/2/2
VESA local bus slots/number free	2/2	2/1	0/0	2/0	2/0	2/0	0/0	0/0	2/0
Externally accessible 3½-inch/5¼-inch drive bays	1/2	0/2	1/2	2/3	2/3	2/2	1/0	1/2	1/3
Internal 3½-inch/5¼-inch drive bays	1/0	1/0	1/0	0/0	2/0	1/0	1/0	1/0	2/0
169-pin CPU	○[2]	●	○[2]	○	○[2]	●	○	○	○[2]
238-pin CPU upgrade socket	●	●	●	○	●	●	○	●	○
ZIF CPU upgrade socket	○	●	○	○	●	●	○	○	○
Design and construction									
Case style	compact	compact	compact	desktop	tower	minitower	pizza box	slimline	compact
Ports: parallel/serial/mouse/MIDI or game/audio	1/2/1/0/0	1/2/1/0/1[3]	1/2/1/0/0	1/2/0/2/1	1/2/1/1/0	1/2/0/1/0	1/1/1/1/0	1/2/1/0/0	1/2/0/1/0
Service and support[4]									
Warranty (months)	12	12	24	12	12	12	36	12	36
On-site service price for first year	free	free	free	$69	free	free	free	free	$30
Turnaround policy (days)	3	2	7 or more	3	2	2	2	3	3
Toll-free support number	●	●	●	●	●	●	●	●	●
Weekday support (hours)	14	24	24	9	12	9	24	24	12
Weekend support	●[9]	●	●	○	●[9]	○	●	●	●[6]
BBS	●	○	●	●	●	●	●	●	●
Fax	●	○	●	●	●	●	●	●	○

[1] Includes CD ROM drive. [2] Uses 168-pin DX2-66 socket. [3] Also includes SCSI port. [4] All companies listed provided unlimited free support, except Hewlett-Packard, which provides three years' free support.

	Diamond DT 486C-40 VL	DTK Grafika-4V2D-S2	BEST BUY Eltech Splendor III	Everex Step VL EISA DX2/66	Gateway 4DX-33	Hewlett-Packard Vectra 486/33VL Model 240	Insight 486DX2-66 VL	Logisys L-Windows 486DX/33	Micro Express MicroFlex-VL/S	BEST BUY MicroSource Tempest 486VLB-66	MIS Promis SL-66	National MicroComputers 486 VL-Bus Winstation
	$1439	$1725	$1999[1]	$2663	$1895	$2316	$2199	$2250	$1999	$2499	$2499	$1891
	Cx486S-40 FasCache	i486SX-25	IBM 486SLC2-66	i486DX2-66	i486DX-33	i486DX-33	i486DX2-66	i486DX-33	Cx486S-40 FasCache	i486DX2-66	i486DX2-66	i486DX-33
	AMI	AMI	AMI	Everex	Phoenix	AMI/HP specs	Award	AMI	AMI	AMI	Phoenix	AMI
	4/128	8/32	8/16	8/256	8/32	8/32	8/128	8/32	16/32	8/32	8/64	8/32
	256/256	128/256	128/128	256/1024	128/256	128/128	128/256	128/256	256/256	256/256	256/256	256/256
	Conner CP30174E	Quantum ELS-170	Western Digital Caviar 2250	Seagate ST3283A	Western Digital Caviar 2340	Quantum ProDrive LPS	Maxtor 7245A	Conner CP30174E	Western Digital Caviar 2200	Conner CP30254	Quantum ProDrive LPS	Western Digital Caviar 2200
	212	170	250	240	340	240	240	212	220	250	240	212
	expansion card	expansion card	expansion card	expansion card	integrated	integrated	expansion card	expansion card	expansion card	expansion card	integrated	expansion card
	1.2, 1.44	1.2, 1.44	1.2, 1.44	1.44	1.2, 1.44	1.44	1.2, 1.44	1.2, 1.44	1.2, 1.44	1.2, 1.44	combo	combo
	32-bit VLB	32-bit VLB	32-bit VLB	32-bit VLB	n/a	n/a	32-bit VLB	32-bit VLB	32-bit VLB	32-bit VLB	n/a	32-bit VLB
	CardExpert Cardex W32	Diamond Stealth 24VLB	Alaris Tomahawk	Diamond Viper VLB	n/a	n/a	STB Horizon VL	Genca Windows VGA 24+	Diamond Viper VLB	Diamond Viper VLB	n/a	STB Power-Graph VL-24
	Tseng	S3	Cirrus Logic	Weitek	Cirrus Logic	Cirrus Logic	Cirrus Logic	Cirrus Logic	Weitek	Weitek	S3	S3
	1MB DRAM	1MB DRAM	1MB DRAM	2MB VRAM	1MB DRAM	1MB VRAM	1MB DRAM	1MB DRAM	2MB VRAM	2MB DRAM	1MB DRAM	1MB DRAM
	CTX 5468N	DTK Grafika DUA-1628	Eltech OEM	Lion America	Crystalscan 1024NI	HP Super VGA	CTX CMS 1561	CTX CVP 5468A	Micro Express SuperVGA	Mag MX15F	CTX CVP-5468NI	ADI Micro-Scan 3G
	14	14	14	15	14	15	15	14	14	15	14	14
	○	○	○	○	○	○	○	○	○	○	internal	○
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14,400/14,000	n/a
	○	○	●	○	○	○	○	○	○	○	○	○
	0/3/0	0/4/0	0/4/1	5/0/0	0/5/0	0/4/0	0/4/2	0/4/0	0/5/0	0/3/0	0/3/0	0/6/0
	2/0	2/0	2/0	1/0	0/0	0/0	2/0	2/0	2/0	3/1	1/1	2/0
	2/3	2/3	2/2	2/3	1/2	0/3	2/3	0/4	2/3	2/2	1/1	0/3
	0/0	1/0	1/0	3/1	1/0	0/1	0/0	4/2	1/1	1/0	0/1	3/0
	○	○	○	○[2]	○	○	●	○	○	○[2]	●	○[2]
	●	●	○	●	●	○	●	○	●	○	●	●
	●	○	○	●	●	○	○	○	●	○	●	●
	compact	desktop	minitower	compact	desktop	compact	compact	tower	minitower	minitower	slimline	compact
	1/2/0/ 1/0	1/2/0/ 0/0	1/2/0/ 2/1	1/2/0/ 0/0	1/2/1/ 0/0	1/2/1/ 0/0	1/2/0/ 1/0	2/2/0/ 0/0	1/2/0/ 0/0	1/2/0/ 1/0	1/2/1/ 0/0	1/2/0/ 1/0
	15/24[5]	12	12[6]	24	12	36	12	24	24	24	12	12/24[7]
	$75	free	$69	free	free	free	○	$100	$50	$55	$20	$39
	2	7 or more	2	2	none	none	none[8]	2	2	3	1	1
	●	●	●	○	●	○	●	●	●	●	●	●
	9	9	8.5	10	18	12	24	9	24	9	10	9.5
	●	○	○	○	●[9]	○	●	○	●	●[9]	○	○
	●	●	○	●	●	●	○	○	○	○	○	●
	●	●	●	●	●	●	●	○	●	●	●	●

[5] 15 months on parts, 24 months on labor.
[6] 36-month warranty on motherboard.
[7] 12 months on parts, 24 months on labor.
[8] Most repairs handled within 72 hours.
[9] Saturday only.

Table continues on following page

FEATURES COMPARISON

Power Systems at Value Prices continued

● Yes
○ No
n/a = not available

	NCR 3230 Local Bus	NEC PowerMate 466	Nettis N433VL	Packard Bell PB 486SX/33	BEST BUY Polywell Poly 4586VR	Quill Qtech VL-4334	Tandy 3106	Tangent M440VL
Standard features								
Selling price as of 9/1/93	$2310	$2917	$1690	$1448	$2500	$1999	$1699	$1595
CPU	i486SX-33	i486DX2-66	i486DX-33	i486SX-33	i486DX2-66	i486DX-33	i486SX-33	Cx486S-40 FasCache
BIOS	NCR	Phoenix	AMI	Phoenix	AMI	AMI	Phoenix/Tandy	AMI
Installed/maximum RAM (MB)	8/32	8/32	8/32	4/36	8/64	8/64	4/64	4/32
Secondary RAM cache installed/maximum (K)	64/256	256/256	128/256	0/512	256/1024	256/256	0/0	256/1024
Hard disk	Western Digital Caviar 2340	Western Digital Caviar 1170	Conner CP30254	Seagate ST324-383	Western Digital Caviar 2340	Western Digital Caviar 2250	Western Digital Caviar 2200	Quantum ELS
Size (MB)	340	170	250	210	340	250	212	170
Adapter	integrated	integrated	expansion card	integrated	expansion card	expansion card	integrated	expansion card
Floppy drives (MB)	1.44	1.44	1.2	1.2, 1.44	1.2, 1.44	combo	1.44	1.44
Graphics adapter	n/a	n/a	32-bit VLB	n/a	32-bit VLB	32-bit VLB	n/a	32-bit VLB
Vendor and model number	n/a	n/a	Genoa Windows VGA 24+	n/a	Orchid Fahrenheit 1280+ VLB	OEM Cirrus Logic	n/a	Hercules Dynamite
Video processor	Cirrus Logic	Cirrus Logic	Cirrus Logic	Headland	S3	Cirrus Logic	Cirrus Logic	Tseng
Installed memory	1MB VRAM	1MB DRAM	1MB DRAM	512K DRAM	1MB DRAM	1MB DRAM	512K DRAM	1MB VRAM
Monitor	NCR 3298-0272	NEC 4FGe	CTX CVP-5468A	Packard Bell PB8549SVGL	Polywell CAC14Mg	CTX CMS 1561	Tandy I/GM-390	Tangent VCP 5468A
Screen diagonal (inches)	15	15	14	14	14	15	14	14
Fax-modem	○	○	○	internal[1]	○	○	○	○
Fax/data speed (bps)	n/a	n/a	n/a	n/a / 2400	n/a	n/a	n/a	n/a
Sound board	○	○	○	○	○	○	●	○
Expandability								
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/3/0	0/3/0	0/2/2	0/4/0	0/5/0	0/5/0	0/2/0	0/5/0
VESA local bus slots/number free	0/0	0/0	3/1	0/0	3/1	2/0	0/0	2/0
Externally accessible 3½-inch/5¼-inch drive bays	1/1	1/2	2/3	1/2	2/3	2/3	1/1	0/3
Internal 3½-inch/5¼-inch drive bays	1/0	1/0	0/0	1/0	3/0	0/0	1/1	3/0
169-pin upgrade	○	○[2]	○[2]	○	○[2]	○	●	○
238-pin CPU upgrade socket	●	●	●	●	●	●	●	●
ZIF CPU upgrade socket	●	●	●	●	●	●	●	●
Design and construction								
Case style	compact	slimline	compact	compact	tower	compact	slimline	compact
Ports: parallel/serial/mouse/MIDI or game/audio	1/2/1/0/0	1/1/1/0/0	1/2/0/1/0	1/1/1/1/0	1/2/0/1/0	1/2/0/1/0	1/2/1/1/1	1/2/0/0/0
Service and support[3]								
Warranty (months)	36	36	12	12	12/60[4]	12	12	12
On-site service price for first year	free	free	$75	free	$75	free	$129	free
Turnaround policy (days)	3	7 or more	2	none	2	none[5]	2	2
Toll-free support number	●	●	●	●	●	○	○	●
Weekday support (hours)	24	11.5	10	24	10.5	10	10	11
Weekend support	●	○	●[6]	●	●[6]	○	○	●[6]
BBS	●	●	●	●	○	●	●	●
Fax	○	●	●	●	●	●	●	●

[1] No fax.
[2] Uses 168-pin DX2-66 socket.
[3] All companies listed provide unlimited free support, except Hewlett-Packard, which provides three years' free support.
[4] 12 months on parts, 60 months on labor.
[5] All repairs handled on site.
[6] Saturday only.

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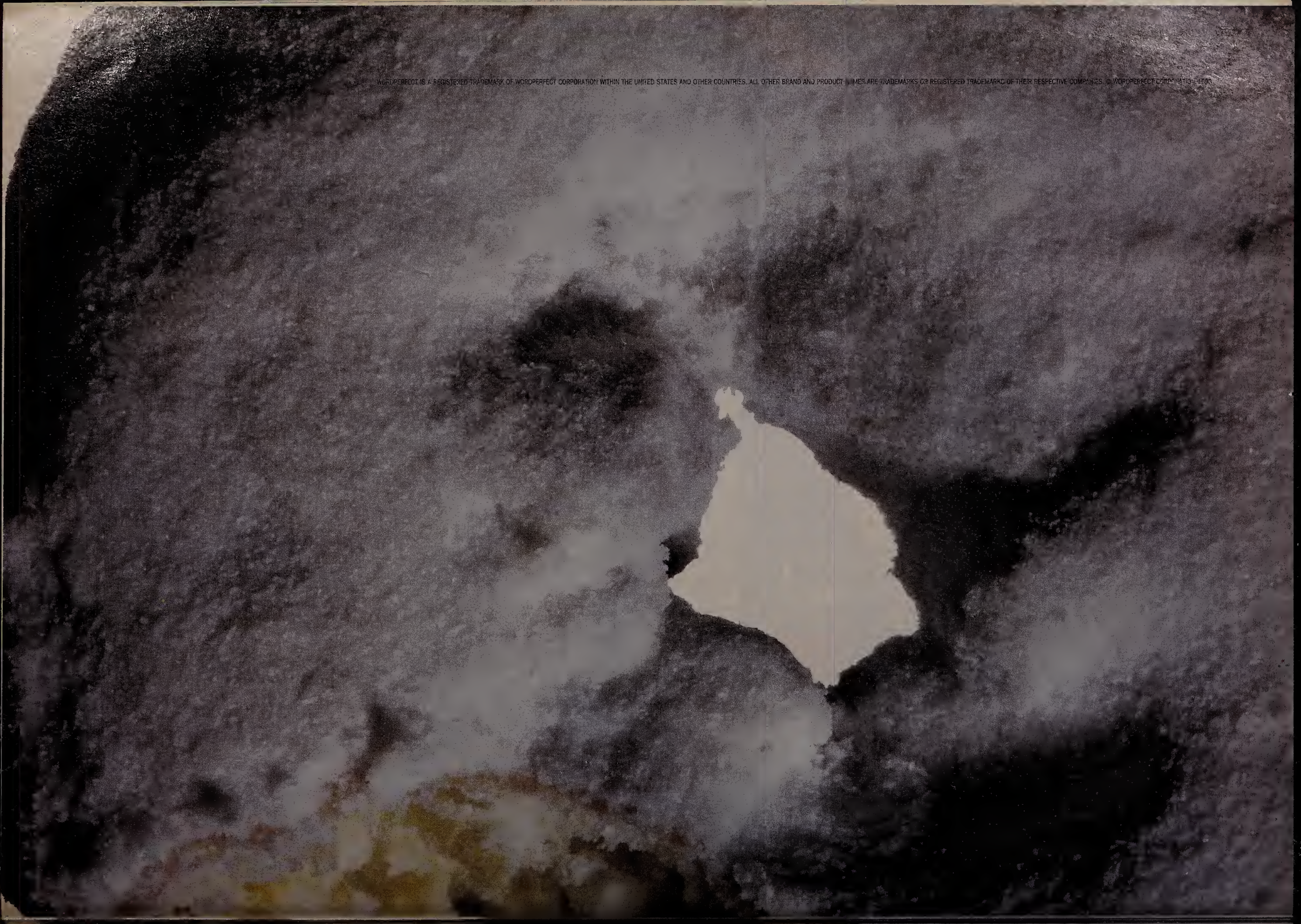

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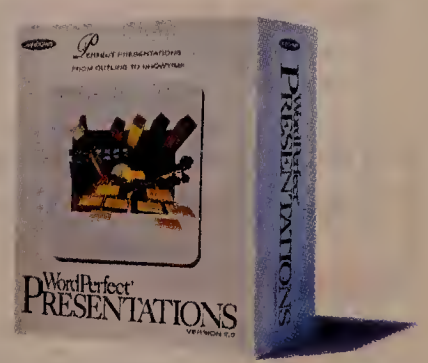

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FOR WINDOWS

Win a Polywell 486DX2-66

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Polywell Poly 4586VR, a 486DX2-66 Best Buy featured in this month's system review.

HOW TO ENTER: Fax your completed questionnaire, along with your name and phone number, to *PC World* at 415/267-1779. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 12-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than December 31.

HOW TO FILL OUT THE FORM: FOR BEST RESULTS, PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Ambra ○ Apple ○ AST ○ Austin ○ Axik ○ Blackship ○ Canon ○ Compaq ○ CompuAdd ○ Compudyne ○ CompuTrend ○ Cornell ○ DEC ○ Dell ○ DTK ○ Epson ○ Everex ○ Gateway ○ Grid Systems ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Insight ○ Leading Edge ○ Micro Express ○ Micron ○ MIS ○ Mitac ○ NCR ○ NEC ○ Northgate ○ Packard Bell ○ Panasonic ○ PC Brand ○ Samsung ○ Sharp ○ Swan ○ Tandon ○ Tandy ○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ Twinhead ○ Unisys ○ USA Flex ○ Wang ○ Wyse ○ Zenith ○ Zeos ○ Other (specify): _____ _____

Is this PC a...?
○ Desktop
○ Notebook/laptop
○ Hand-held

Is this PC a...?
○ Pentium/586
○ 80486
○ 80386
○ 80286
○ Other (specify): _____

Where did you purchase this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home/electronics store
○ Retail store
○ VAR
○ Other (specify): _____

When did you buy this PC?
○ This month
○ 1–3 months ago
○ 4–6 months ago
○ 7–12 months ago
○ More than 12 months ago
○ Not sure

Would you buy this brand of PC again?
○ Yes
○ No

Do you use this PC at...?
○ Work ○ Home ○ Both

In terms of PC skills, would you describe yourself as...
○ Novice ○ Intermediate ○ Experienced

WHAT ARE YOU REPORTING? (Check only one.)

○ No problems ever
○ No problems since last responded to survey
○ A problem since last responded to survey
○ An older problem not previously reported in this survey

If you're NOT reporting a problem, please fill out the Uptime Report (below).

To REPORT a problem, fill out the Problem Report (right column).

UPTIME REPORT

How many consecutive months has your PC been trouble-free?

○ 3 months ○ 6 months ○ 9 months ○ 12 months ○ 15 months ○ 18 months ○ More than 18 months

■ **STOP HERE if you're not reporting a problem.**

PROBLEM REPORT

When you first received your NEW PC, was any component "dead on arrival"?
○ Yes ○ No ○ Don't know

If so, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

■ **For the following questions, describe your most recent HARDWARE-related problem with this PC.**

Did you contact the manufacturer for repair service or technical support?
○ Yes
○ No
○ Not sure

What was this problem finally identified as?
○ Faulty component
○ Incorrectly installed software
○ Wrong configuration
○ Faulty peripheral
○ Device conflicts
○ OS problem
○ Other
○ Don't know

If a component failed, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

How many times have you had a problem with this PC?
○ This was first time ○ Two ○ Three ○ Four ○ More than four

Did the problem occur under warranty?
○ Yes
○ No
○ Not sure

How recently did this problem occur?
○ This month
○ 1–3 months ago
○ 4–6 months ago
○ 7–12 months ago
○ More than 12 months ago
○ Not sure

How long after PURCHASE did this problem occur?
○ Less than 1 month
○ 1–3 months
○ 4–6 months
○ 7–12 months
○ More than 12 months
○ Not sure

■ **For the following questions, describe your most recent SERVICE or SUPPORT experience.**

What type of service/support did you receive?
○ Phone ○ On-site ○ In-store help ○ Express system swap ○ Express component swap ○ Factory return

If phone service, how long were you on hold?
○ Not at all ○ Less than 1 min. ○ 1–2 min. ○ 2–5 min. ○ 5–10 min. ○ 10–20 min. ○ More than 20 min.

How long did it take before you talked to the person who finally helped you?
○ Less than 1 hour ○ 1–24 hours ○ 1–2 days ○ 3–5 days ○ 1 week ○ More than 1 week

How long did it take to resolve the problem completely?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 1 month ○ Never resolved

Was the problem resolved to your satisfaction?
○ Yes ○ No

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied were you with the service and support you received?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Satisfied — Extremely satisfied

How likely is it that you would recommend this brand of PC to a friend or colleague?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Likely — Extremely likely

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IBM Customer Engineer

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L-R: Alice Robinson, Gregg McGhee, Jeff Herman and Beverly Whitman, Custom Build Technicians, IBM Personal Computer Company

425SX/Si

ValuePoint Si — NEW!

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- Choice of IBM Keyboard (Basic†† or Enhanced)
- A great, low-cost network client
- IBM HelpWare service and support
- IBM 14V 14" SVGA NI Monitor

433DX/D

ValuePoint Desktop

- Plenty of room to grow: 5 slots (includes 1 VESA Local Bus slot), 5 bays
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- IBM 14V 14" SVGA NI Monitor

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466DX

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- IBM 15V 15" SVGA FS NI Monitor

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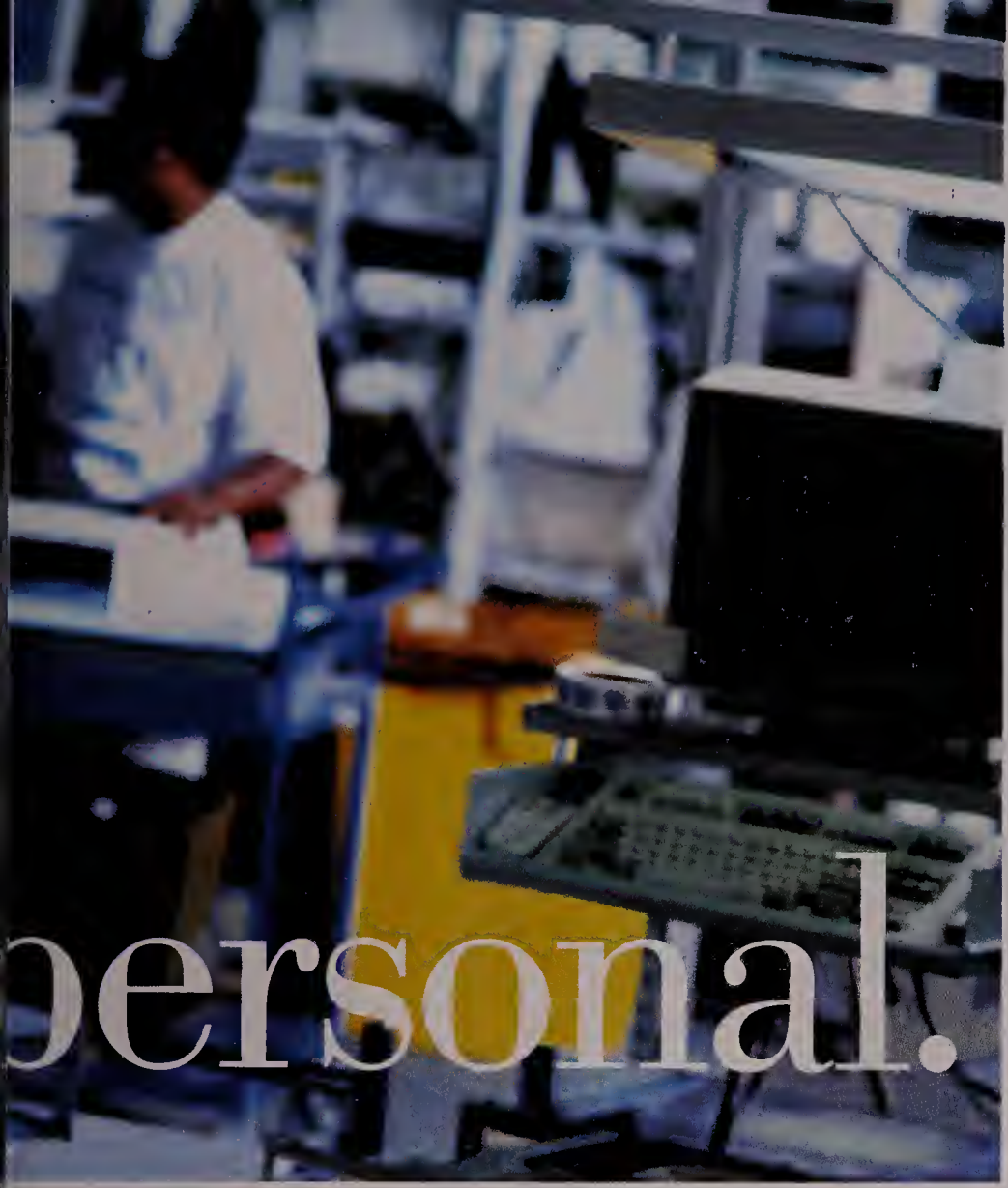

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intel inside

All ValuePoint Desktop and Mini-Tower systems listed below feature:[††]

- 486 processors
- SVGA VESA Local Bus Video
- Upgradability via Intel OverDrive™ technology all the way up to Pentium™ [3]
- 101-key IBM Enhanced Keyboard and IBM Mouse
- Zero Insertion Force (ZIF) socket for fast, easy processor upgrades
- A 32-bit VESA Local Bus slot for local bus speed on SCSI drives and other peripherals
- IBM HelpWare

ValuePoint Si	425SX/Si	425SX/Si	433DX/Si	425SX/Si
Processor	i486SX/25MHz	i486SX/25MHz	486DX/33MHz†	i486SX/25MHz
Hard Drive/Memory	120MB/4MB	212MB/4MB	120MB/4MB	120MB/4MB
Drives	3.5"	3.5"	3.5"	3.5" & CD-ROM
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 6318 14" SVGA	IBM 14V 14" SVGA NI
Operating System	IBM DOS & WINDOWS™	IBM DOS & WINDOWS	IBM DOS &WINDOWS	IBM DOS &WINDOWS
Price* / IBM Credit Lease**	**$1,539** / $56 per month	**$1,699** / $61 per month	**$1,729** / $62 per month	**$1,854** / $67 per month
ValuePoint DeskTop	**425SX/D**	**433DX/D**	**425SX/D**	**433DX/D**
Processor	i486SX/25MHz	486DX/33MHz†	i486SX/25MHz	486DX/33MHz†
Hard Drive/Memory	120MB/4MB	120MB/4MB	245MB/4MB	340MB/4MB
Drives	3.5"	3.5"	3.5" & CD-ROM	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 6318 14" SVGA
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS &WINDOWS
Price* / IBM Credit Lease**	**$1,709** / $62 per month	**$2,059** / $74 per month	**$2,194** / $79 per month	**$2,219** / $80 per month
ValuePoint Mini-Tower	**433DX/T**	**433DX/T**	**433DX/T**	**466DX2/T**
Processor	486DX/33MHz†	486DX/33MHz†	486DX/33MHz†	i486DX2/66MHz
Hard Drive/Memory	340MB/4MB	340MB/4MB	340MB/8MB	527MB/4MB
Drives	3.5"	3.5" & CD-ROM	3.5" & CD-ROM	3.5"
Monitor	IBM 6318 14" SVGA	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 15V 15" SVGA FS NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	OS/2®	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$2,329** / $84 per month	**$2,804** / $101 per month	**$2,994** / $108 per month	**$3,399** / $123 per month

† Some 486DX/33MHz processors may be manufactured by IBM. †† ValuePoint Si systems do not include all features listed above chart. Please refer to product details listed at left, or call for more information. ValuePoint Si prices listed reflect IBM Basic Keyboard only. IBM Enhanced Keyboard available at additional cost.

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VL vs. PCI

Betting on a Bus

By Michael Desmond

Two high-performance buses vie for mastery of the desktop PC. Which one is best for you as PCs move to full-color graphics and data-hungry applications?

Call it the Year of the Local Bus. In 1993, the VESA local bus became a fixture in most new 486 desktop PCs. And for good reason: By connecting the CPU and peripherals directly over a wide, high-speed data path, VL bus systems and components have proven that they ean deliver enormous performance gains over their ISA counterparts, at almost no extra cost. So why do many major system vendors contend that VL's days are numbered? Three words: *Peripheral Component Interconnect* (PCI).

Not a catchy name perhaps, but PC makers expect the new PCI bus standard to catch on in a big way. The brainchild of microchip giant Intel, PCI is expected to be better

PHOTOGRAPHS: GEOFF SPEAR

suited to the growing challenges of high-speed desktop computing, with a more complex, flexible, and feature-rich design than VL bus. And with industry heavyweights such as IBM, Compaq, NEC, and Dell solidly behind it, PCI has sufficient backing to make it a serious contender—even against the entrenched VL bus.

Suddenly the question is no longer whether to buy a system with a local bus, but rather which bus to buy. Do you go with an affordable VL system now, wondering if there will still be a wide selection of VL peripherals in two years? Or do you throw hundreds of dollars more at a PCI system in the hope that key PCI peripherals such as graphics cards and disk controllers will reach the market before the rest of your system is obsolete?

The answer will depend as much on your computing needs as it does on the decisions of system and peripherals vendors. Although VL bus offers more than enough power for most 486 desktops, PCI is gaining momentum fast. Why? Because a bus architecture is a lot like the stock market: It is only as strong as people believe it to be. And at the moment, the majority of system vendors, and by default the peripherals makers, are committed to PCI.

The success of VL speaks for itself. Since August 1992, millions of VL systems have been sold, with many vendors moving all their desktop PCs to VL bus designs.

The Language of Local Bus

The stage for this drama was set when Windows brought full-color graphics to the PC. Inside the CPU, fast 486 processors were moving data around at 33 MHz, using the 32-bit-wide local bus that exists inside the chip. But that rush of graphics data hits a narrow tube once it enters the ISA bus. Designed ten years ago, ISA runs at a modest 8 MHz and is only 16 bits wide. As applications move to true-color graphics, full-motion video, and 3-D rendering, ISA is simply overmatched.

To eliminate the choke point, system and peripherals vendors had to create a data shortcut for the most demanding components. By hooking the graphics adapter and perhaps other select peripherals directly to the processor, vendors could open a fast, wide path for components that need the speed most. And that's where local bus standards like VL bus come in. By creating a universal way to plug into the processor's high-speed bus, a standardized local bus can remove these bottlenecks from all new PCs.

The VL and PCI buses do essentially the same thing. Both offer a 32-bit data path between the CPU and peripherals, both run at high speeds (33 MHz for PCI, as high as 40 MHz for VL), and both deliver similar throughput speeds (120MB/sec for PCI, 132MB/sec for VL). In addition, both VL and PCI offer some degree of backward compatibility with existing ISA peripherals.

Indeed, VL and PCI provide similar performance, at least on existing systems. When we ran similarly configured Pentium-based PCI and VL bus systems through our Windows application test suite, we found no clear performance winner. While a PCI system posted the top numbers in our runoff, the second-place finisher, built around a VL bus, trailed by less than 2 percentage points. For most users, that is not a compelling performance margin.

But the two standards diverge from there—and the differences could determine which one survives. VL bus was conceived as an inexpensive, quick-to-market solution. Built on the local bus already present in all Intel 486 CPUs, it runs at the speed of the processor or, in the case of clock-doubled DX2 CPUs, at half the processor speed. At most, it will support two or three components, boosting the performance of graphics boards and perhaps hard disks. Equally important, VL bus systems and peripherals cost little, if any, more than their ISA-only counterparts.

The success of VL bus speaks for itself. Since its introduction on August 28, 1992, millions of VL systems have been sold, with many vendors moving all their desktop systems to VL bus designs. Peripherals makers have also enjoyed a booming business, as users flock to systems offering graphics accelerators and often hard disk controllers on the VL bus.

"Our judgment is that VL will be absolutely dominant in the 486 market by the end of 1993," says Martin Reynolds, an analyst at InfoCorp, a market research firm in Santa Clara, California. "There's no question in my mind that 486-VESA is an unbreakable combination. The only holdouts are people like AST, NCR, and Compaq."

So why have virtually all the major system and peripheral vendors backed PCI? For an answer, you need to look three to five years into the future. PCI was designed to work with high-end chips beyond the 486, such as Pentium and other non-*x*86 CPUs. VL bus lacks this forward compatibility. Unlike VL bus, which hooks directly into the processor, PCI puts a layer between the CPU and peripherals. The result is what Intel calls a *processor-independent* bus that can be easily hooked into a wide variety of CPUs, including Intel's Pentium; DEC's Alpha; MIPS R4400; and Motorola, Apple, and IBM's PowerPC. For system vendors, the result is lower development costs since they can reuse system designs across CPU platforms.

PCI also offers a laundry list of additional features. The specification includes automatic peripheral configuration, so users can plug in add-on boards without having to deal with IRQ levels, DMA channels, and memory addresses. For system makers, low-voltage capability and the 64-bit interface make the PCI bus optimal for multiple product lines. And PCI's layered design reduces electrical stress on the CPU, letting systems run up to six peripherals.

So how much will this sophistication cost? Vendors expected the technology to add several hundred dollars to the price of PCI systems, but that may change as Intel, the only PCI chip set manufacturer, tries to wrest market share from the red-hot VL bus standard.

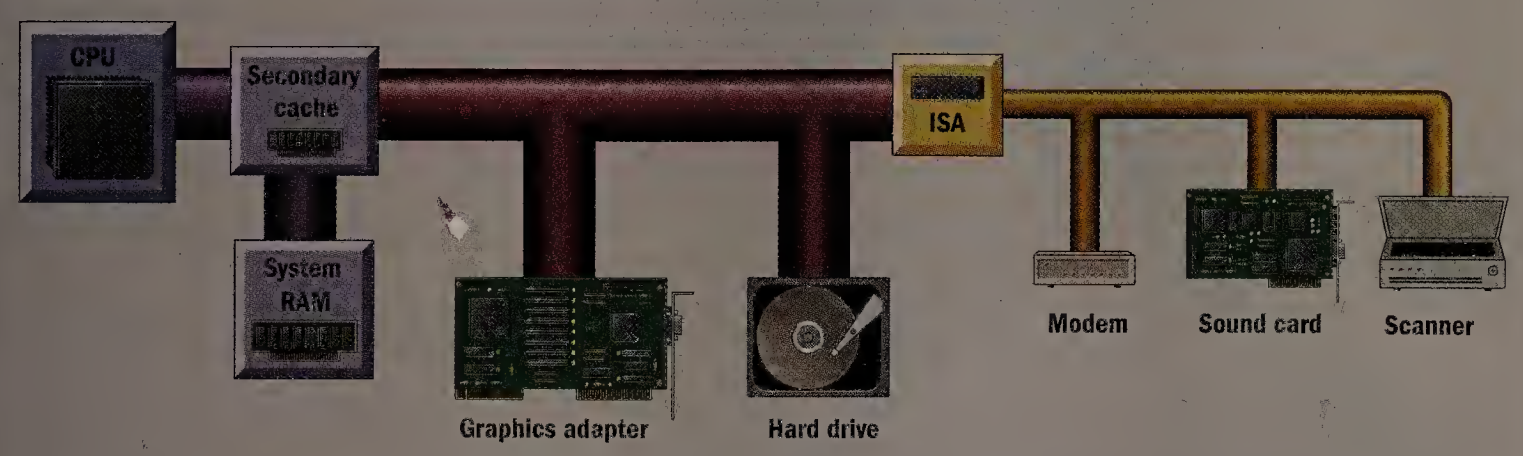
InfoCorp Vice President Kimball Brown believes Intel will forgo short-term profits in order to move PCI into the market. "Intel can

Moving Data Through the Bus

Improving on ISA

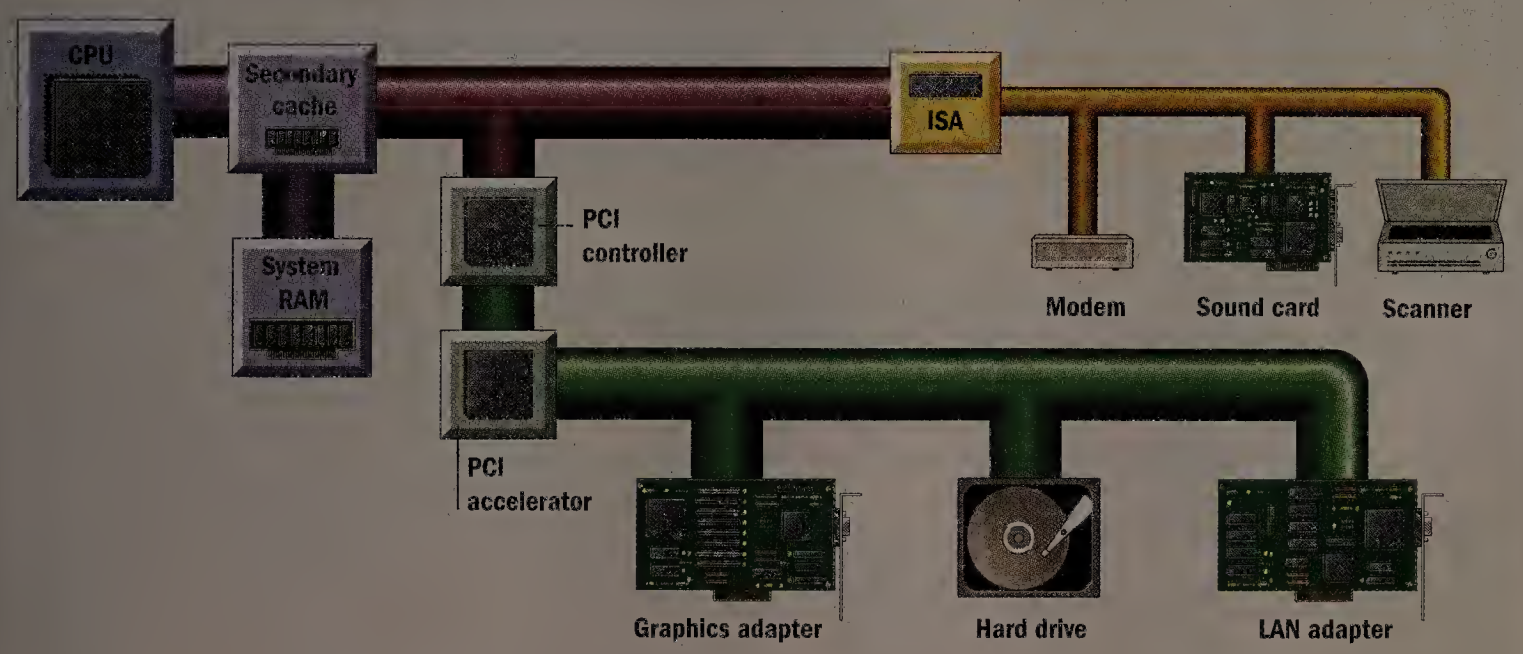
ISA's 8-MHz, 16-bit data transfer rate is too slow for today's fast CPUs, large files, and graphics-laden apps. The Peripheral Component Interconnect (PCI) bus and the VESA local (VL) bus speed up data transfers, especially for sequential data, the diet of hard disks and graphics cards. But each takes a different tack to move data between system memory and peripherals.

VL Bus: The Direct Approach

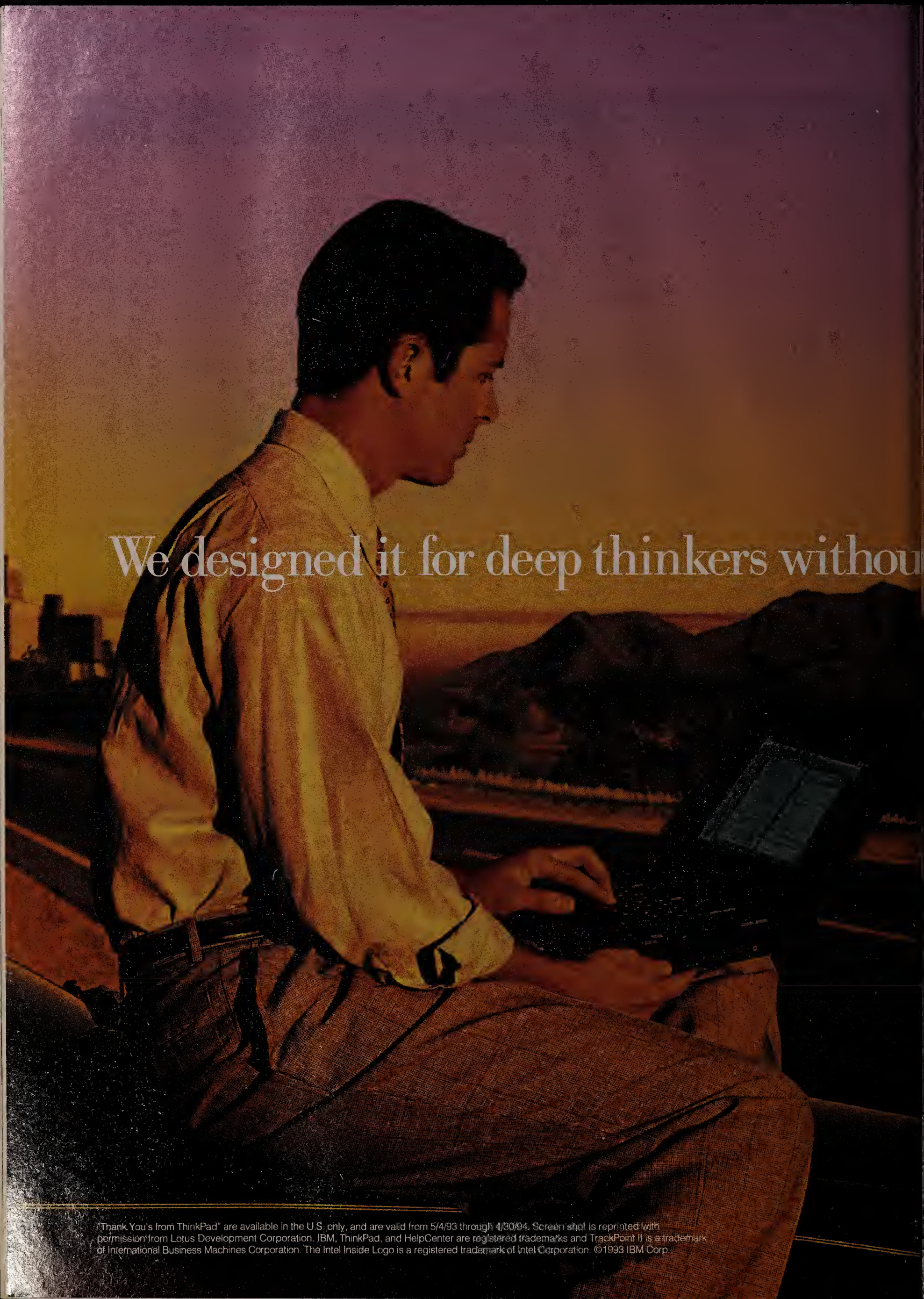


The VL bus is an extension of the 486 CPU's local bus. Data travels straight through the CPU bus to the VL bus. Some VL adapter cards include buffering to ensure data is not lost before the peripheral is able to use it. Because the VL bus generally moves data at speeds of between 25 MHz and 40 MHz, VL cards must be able to handle different clock rates. Each VL card adds a load to the CPU bus, reducing the bus's signals and limiting VL to just two or three peripherals.

PCI Bus: More Than a Local Bus



PCI adds a controller and an accelerator chip to create a bus separate from the CPU's and supports several means to boost data throughput. One way PCI speeds up transfers is by bursting sequential data. For nonsequential data, the CPU must take time to set the address of the piece of data it is about to read and then take even more time to read that piece. But for sequential data, like graphics memory and disk files, bursting sets the next address while reading the current address's data. Another method to move sequential data, called multiplexing, doubles throughput by sending data down the address lines. Finally, the PCI accelerator chip can hold data in its buffers, letting the accelerator read data from memory while simultaneously bursting data to a peripheral. And because the PCI bus is separate from the CPU bus, its signals can be boosted to support more peripherals than the VL bus.



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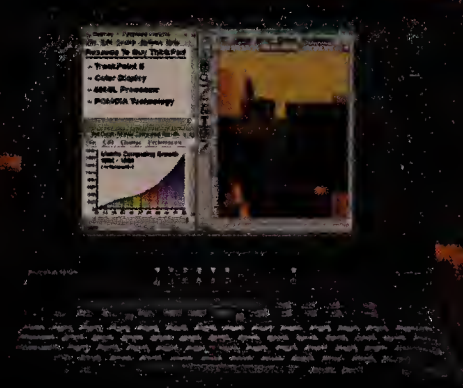
Price: $1,999.00 for 125MB††	Who says power has its price?

Human by design.



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price things so that it is pretty much a no-brainer to go to PCI. They are going to force the standard to kick in, because they'll only be charging $15 for the chip set."

For users, that means PCI systems and peripherals may quickly become price-competitive with similarly configured VL systems. That may be critical to PCI's success, since most users will not perceive enough difference in the performance and feature set of PCI to pay more than they do for VL. Thus, many who wouldn't consider anything but a VL system will now give PCI a serious look.

"Is it worth $1000? I'd say no," says Glenn Schuster, high-performance-product manager at S3 Incorporated, a leading maker of graphics accelerator chips. "Is it worth $100? Maybe. But is it worth $20? Certainly."

Moving Targets

Some would argue that even $20 is too much to pay for PCI, since VL bus already addresses the needs of all but the most demanding users. "Intel has hyped PCI beyond any reality. Graphics is the primary, and in my opinion, the only, beneficiary of a local bus connection," says Jon Peddie, editor in chief of the *PC Graphics Report* in Tiburon, California. "The annoying thing is the industry hype—they think it won't be accepted by people unless they make it splashier than it really is."

Hype aside, PCI is poised to become the next enhanced-bus standard for the PC, though that day is still several years off. "I haven't talked to anyone who has said anything other than that PCI is the architecture for the Pentium," says Ted Julian, an analyst for IDC, a market research firm in Framingham, Massachusetts. "What that does is castrate VL's chanees for the long run."

Which is exactly what Intel and PCI proponents are counting on. Even as VL bus roared into the 486 market, PCI backers have implied that VL bus is a dead-end standard, that it will be virtually doomed when 486 CPUs begin to fall out of favor in the mid-1990s. But despite such talk, Intel is looking to blunt VL's momentum by pushing its PCI standard into the 486 market.

"Intel has not been out trying to bad-mouth VL, telling people not to buy VL. Intel is in this to keep the PC platform healthy. And that helps Intel sell more CPUs, of course," says Mike Bailey, Intel's director of marketing for PCI. "The sooner PCI gets established as the key standard, the better it is for the industry. And we

Déjà Vu All Over Again

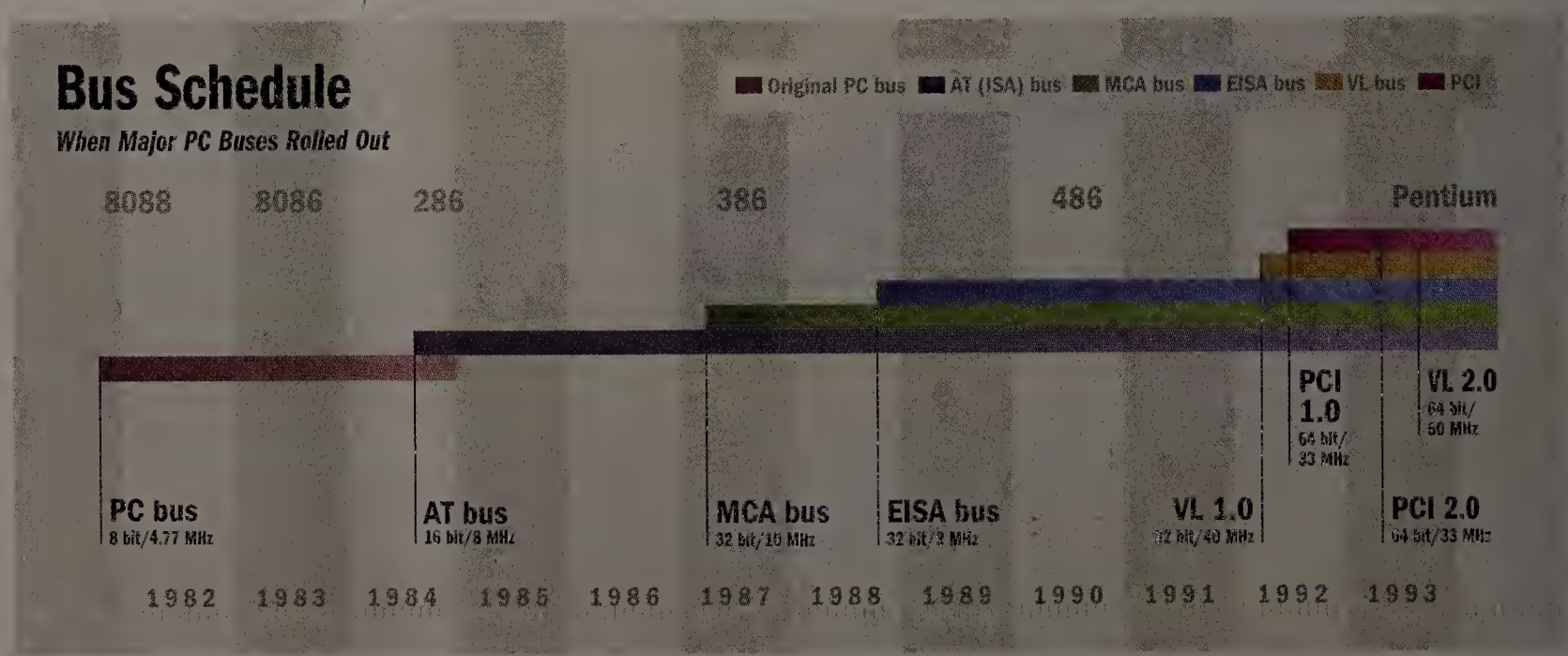
If all this bus competition sounds vaguely familiar, it's probably because it is. Not five years ago, a similar struggle for bus supremacy pitted PC standard-bearer IBM against the so-called Gang of Nine, which included clone makers such as Compaq, NEC, and AST. Surprisingly, the basic issue—how to improve on the lowly 16-bit, 8-MHz ISA bus—was the same one framing today's VL bus-PCI debate.

It all started in April 1987 when IBM—smarting from the loss of market share to PC clone makers—announced the PS/2 line of personal computers based on its own Micro Channel architecture (MCA) bus. The new bus improved on ISA by offering a 32-bit interface, a 10-MHz clock speed, and features such as auto-configuration and bus mastering.

The clone makers countered in May 1989 with the Extended Industry Standard Architecture (EISA). Like MCA, EISA ran 32 bits wide and offered auto-installation and bus mastering. Unlike IBM's bus, EISA was fully ISA compatible—it ran at 8 MHz and allowed any ISA card to work in any EISA slot.

Oddly enough, neither bus emerged a clear winner. According to estimates by InfoCorp, MCA systems represent about 11 percent of the PC sales in 1993. Lack of ISA compatibility, along with high prices and a dearth of MCA peripherals, kept IBM out of the booming mainstream. Not that EISA took the market by storm either. EISA systems, according to InfoCorp, also represent not quite 11 percent of 1993 sales. The reason: The high price of EISA systems and peripherals limited EISA sales to heavy-duty LAN servers and workstations.

The real winner of the Micro Channel-EISA bus war? ISA, which offered satisfactory performance—for no extra money.



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PC MAGAZINE EDITORS' CHOICE
April 27, 1993
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Most Valuable Peripheral Award, *PC/Computing*, Dec. '92

"This is the best PC sound board..."
T. Yager, *Byte*, Dec. '92

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T. Carlton, *PC Games*, Mar. '93

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D. English, *Compute*, Jan. '93

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W. S. Mossberg, *Wall Street Journal*, Oct. '92

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are going to try to penetrate the popular 486 desktop market to make sure the standard is established."

While PCI may make inroads in the 486 market, it's probably too late in the game for it to overcome the success VL bus has enjoyed. Still, Intel's standard may take off in niches where VL has yet to make a strong impact, such as LAN servers. In fact, many think that the first bus to fall victim to PCI will not be VL, but rather EISA or Micro Channel.

"One of the things we've looked at is PCI versus EISA systems, as opposed to PCI versus VL systems," says Jesse Parker, director of product management for the PC Business Unit at DEC. "Our strategy would be to position PCI at the same price point as an EISA system."

In the meantime, the word of the day seems to be coexistence—though it will hardly be peaceful. Nearly half a dozen buses—PCI, VL, ISA, EISA, and Micro Channel—will continue to bump against each other in the PC mainstream. As the market for peripherals and systems grows more fragmented, both vendors and users will have to keep a close eye on which bus standards seem likely to stick around over the next two to three years.

To make matters even more confusing, neither PCI nor VL bus technology is standing still. Version 2.0 of the VL bus architecture has been introduced, adding such features as a multiplexed, 64-bit data path, signal buffering for operation with high-speed motherboards, and a higher maximum clock rate of 50 MHz. Though no VL 2.0 systems exist yet, the most obvious differences between VL and PCI will begin to fade as VL bus grows more complex.

"There's a chance that Pentium-VL will be very, very strong," says Reynolds. "But I don't believe the VESA 64-bit standard will be nearly as influential as the VESA 32-bit standard was. I'd be doubtful of the availability of 64-bit VESA products."

PCI is the computer maker's bus—a sophisticated and flexible solution that lets system vendors quickly and reliably build a variety of PC lines.

But VESA will continue to improve on its successful bus standard. To boost VL's market value, the committee established a certification program to address nagging doubts about compatibility among VL systems and peripherals.

The Shape of Things to Come

So which bus really is better? For most users, either bus will address the most critical problem—speeding up graphics performance. And despite PCI's strong support among system vendors, it's likely that VL bus will continue to be well supported by vendors.

"VL is shipping by the truckload right now, and PCI will likely ship by the truckload in the future," says Joe Curley, marketing director at Tseng Labs, a major maker of graphics chips. "But VL has hit a critical mass that will keep it from dropping off the market right away. As long as there are millions of VL systems out there, there will be support for them as time goes on."

And that is the gist of it. PCI is the computer maker's bus—a sophisticated, elegant, flexible solution that lets system vendors quickly and reliably build a variety of different PC lines. It's also the bus for those running lots of disk arrays off a heavy-duty server, wild-eyed multitaskers using NT or OS/2, and other workstation wannabes working with lots of graphics, video, and other data types.

But for the rest of us, it's more bus than we need. The future may well be headed for PCI, but for the next year or so, a VL bus system, properly designed, offers all the power we can use.

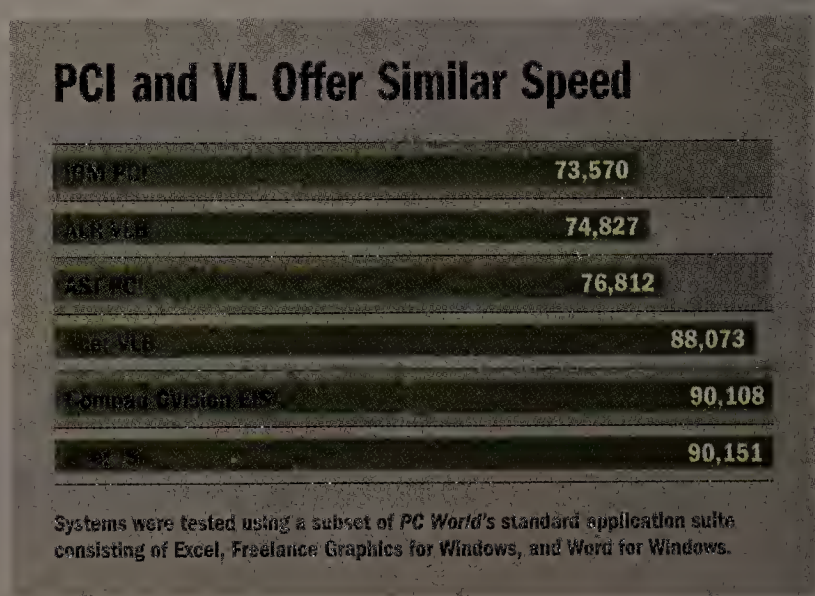
Michael Desmond is an assistant editor for PC World. *He can be reached on PC World Online (see page 10 for contact information)*

Too Close to Call

We checked the numbers and examined the specs. But to determine the performance PCI and VL bus would bring to most users, we ran some of the first PCI systems to hit the market through our test suite. Because all these Pentium systems run graphics off an enhanced bus, we tested their video performance, deriving the results by normalizing and weighting test scores that were originally in seconds.

It was a tight race between PCI and VL bus systems. The PCI-based IBM P60/D finished first, with the ALR Evolution V, a VL system, less than 2 percentage points behind. The other PCI system—the AST Premmia LX—was third, but only 4.5 percent behind the IBM.

Were we surprised by the close finish? Hardly. For all the engineering elegance of PCI, both buses feature similar data capacities. When it comes to working with desktop business applications, few users will notice a performance difference.



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***PC Magazine*, August 1993**

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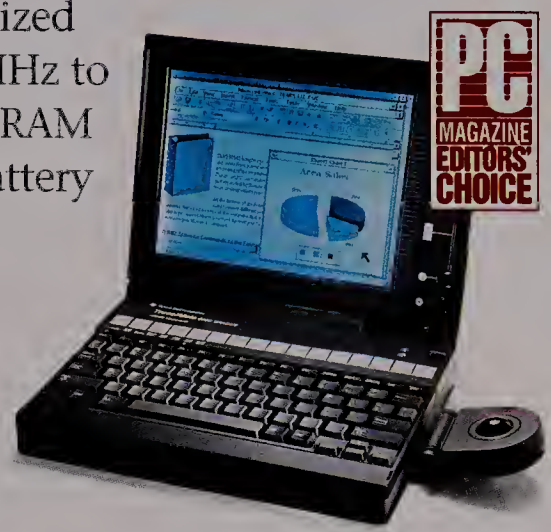

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***PC Magazine*, August 1993**

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Great CD ROMs for Fun and Profit

After weeks of "interacting" with dozens of CD ROM disks, our tireless reporter sorts out the blockbusters from the busts. Here are her picks for the top 25.

You may have sound business reasons for buying a CD ROM drive, but let's face it—you really want one because CD ROMs are fun. After all, publishers promise exciting disks crammed with information, sound, photos, or video—and more interactivity than TV or a book. Is there anything real behind those promises?

To find out, I spent days examining piles of CD ROMs. I expected to find hundreds of winners. Instead, I received a nasty surprise: Most of what I looked at was crude, poorly designed, difficult to use, slow, cantankerous, or otherwise not quite ready for prime time. But by the time the plastic peanuts and boxes had been cleared, I had discovered 25 worthwhile products.

Granted, designing a CD ROM is brand-new territory for many vendors; that's why so many products are nothing more than books on disk. But books are easier on the eyes, and you can't read a CD on the train, curled up in a favorite armchair, or in your dentist's waiting room. So if a CD ROM doesn't have sound, photos, or tons of easy-to-find info, what's the point?

Special effects can make CD ROMs more interesting than books, but there are still some drawbacks: Video clips run only in a small window, photos are often grainy at VGA resolution, and sound files, which take up a lot of disk space, are usually short.

Cramming all this technology together makes multimedia CD ROMs finicky. You can run them on a 386SX with a single-speed CD ROM drive, but the

By Anita Amirrezvani

slowness will drive you nuts. You'd be able to down a couple cups of coffee waiting for Microsoft Encarta, an otherwise great encyclopedia, to load—that's if you picked its fast installation option, which stores nearly 8MB of software on your hard disk. On slower systems, video and sound clips are often choppy; Windows programs absolutely drag. The faster your PC and drive, the more likely you'll enjoy a multimedia disk.

That said, CD ROM has great potential, and some disks actually live up to it. Video, photos, and sound are powerful tools for making learning and games more enjoyable and memorable. You're sure to encounter little treasures that make the text come alive, such as President Ford justifying Nixon's pardon, or the Godfather making an offer no one can refuse.

The CD ROMs covered in this article fall into two main camps. Most of the business titles are straightforward DOS packages that sell for $1000 or more. They usually offer sophisticated searching and reporting capabilities but lack sound and video. The reference and entertainment titles, on the other hand, often provide lots of multimedia effects. The best products are full of stimulating surprises, and they allow you to browse easily and free associate among topics. Read on for some of the best choices.

STREET ATLAS USA provides detailed maps of every U.S. city and even locates street names.

Reference

Explore the U.S. or the World

PLATFORM: *Windows*
SOUND BOARD: *not required*

Watch out, AAA! DeLorme Mapping, producer of oversize road atlases, has crammed detailed maps of the entire United States onto a single CD ROM. **Street Atlas USA** lets you zoom in on any area of the country by typing an area or ZIP code; once you've pinpointed a city, you can locate any street. On larger city maps, you can also pinpoint street address ranges—convenient for locating specific blocks. You can copy maps to the Windows Clipboard, then print them via Paintbrush; version 2.0, which shipped too late for review, will support printing directly from the program. For world atlas buffs, the company's **Global Explorer** product features surface maps of the entire world and street maps of big cities. You'll get the most from these programs on a fast system with super-VGA or better graphics. Each disk lists for $169. DeLorme Mapping, 800/452-5931, 207/865-1234.

Reader service no. 606

Encyclopedia to Go

PLATFORM: *Windows*
SOUND BOARD: *recommended*

Say good-bye to all those jokes about encyclopedia salesmen; **Microsoft Encarta** takes a lot less shelf spaee than an old-fashioned encyclopedia, and it's a lot more fun, too. Select a topic, and up pops a screen of text, color photos, and icons for sound or video clips. Hypertext links are copious; clicking on underlined words in the text takes you to related topics or bibliographic references. Other features include a revolving globe (detailed maps are just a click away) and a time line of historical events. Kids like it too. My only quibble is that Encarta is s-l-o-w, so a fast system is recommended. Encarta retails for $395; by the time you read this, the annual update—which Microsoft says will be 25 to 30 percent faster—will be available at the special promotional price of $99, through December 31. Microsoft Corp., 800/426-9400, 206/882-8080.

Reader service no. 607

For DOS Users: Eight Great Books on Disk

PLATFORM: *DOS*
SOUND BOARD: *not required*

Information junkies who still use DOS, you're in luck. **Toolworks Reference Library** offers eight complete reference works including *Webster's New World Dictionary*, *Webster's New World Thesaurus*, *Webster's Quotable Definitions*, and the handy *Webster's Guide to Concise Writing*, a listing of long-winded phrases with suggested replacements. J.K. Lasser's Legal and Corporation Forms for the Smaller Business, which offers dozens of fill-in-the-blank forms such as partnership, arbitration, and stockholder agreements, is included. You also get a guide to 200,000 addresses and phone numbers, a dictionary of historical events, and The New York Public Library Desk Reference. You can run the program as a TSR, although it can't paste text into newer word processors. The product costs $99.95 and is packed with information, but don't expect fancy hypertext links or multimedia effects. The Software Toolworks, 800/234-3088, 415/883-3000.

Reader service no. 608

A Bookshelf on Disk

PLATFORM: *Windows*
SOUND BOARD: *required*

Imagine having *The American Heritage Dictionary, The Concise Columbia Encyclopedia, The Hammond Atlas, The 1993 World Almanac, Roget's Thesaurus,* and other reference books at your electronic disposal. **Microsoft Bookshelf 1993 Edition** gives you exactly that, with some nice multimedia and hypertext features to boot. Each word in the dictionary has a pronunciation clip, all the words in the thesaurus are hot-linked for quick browsing, and countries in the atlas are hot-linked to the encyclopedia and almanac. One of the best things about Bookshelf is that it integrates with Word for Windows; load the word processor and you automatically get a quote of the day as well as quick access to the seven reference works. List price is $195. Microsoft Corp., 800/426-9400, 206/882-8080.

Reader service no. 609

A Nose for News

PLATFORM: *Windows*
SOUND BOARD: *required*

News fans, stop here. The **1993 Time Compact Almanac** features the complete text of *Time* magazine from 1989 to 1993, plus photos and news clips. It's a good reference tool for adults as well as kids writing term papers. Though it doesn't offer much windowing or many hypertext links, the program makes it easy to find information: Just type in a keyword and you get a list of all relevant articles. For historical research, a summary of each decade's highlights from 1920 is provided, along with full-text articles from each period. Even better, you get a fairly extensive guide to federal organizations and the states, including a map, vital statistics, history, and information on legislators. List price is $149.95. Compact Publishing, 800/964-1518, 202/244-4770.

Reader service no. 610

Shareware Galore

PLATFORM: *DOS, Windows*
SOUND BOARD: *not required*

New Frontiers' CD ROMs are like shareware emporiums. Volumes 1 and 2 of the **MS-DOS Collection** feature more than 6000 and 8000 programs, respectively; the **MS-Windows Collection** offers 6000 Windows 3.*x* programs. The shareware spans a huge range, including standard applications, business, games, utilities, music, fonts, icons, and graphics. Files are organized alphabetically by category and annotated with informative, though short, descriptions. When you're ready to use the files, copy them to your hard disk and unzip them using PKUnzip, which comes with the shareware collection. Future versions of the product will include a menu-driven method for copying and unzipping the files, according to New Frontiers. All four disks will retail for $129, or you can purchase them separately for between $49 and $69 each. Remember, by buying the collection you haven't actually bought the individual shareware—if you like a program enough to keep using it, you will still need to pay the author. New Frontiers CD ROMs, 203/738-7667, 203/379-4184 (fax).

Reader service no. 611

Business

80 Million Numbers at Your Fingertips

PLATFORM: *DOS*
SOUND BOARD: *not required*

Want to identify a group of businesses in another state? Trying to collect on a bill? Lost track of an old sweetheart? If so, you'll love the **PhoneDisc** products. **PhoneDisc USA Business** provides listings on 9.5 million **continued on page 246**

Games People Play on CD ROM

Games are often at the cutting edge of PC technology. Many of today's most exciting games take increased advantage of full-action images, spoken dialogue, music, and sound effects, so delivering these goodies on CD ROM makes a lot of sense. The alternative—providing the software on floppy disks—may require a time-consuming installation process and could hog half your hard disk. There's one problem, though: Accessing compressed image and sound files from a CD can be slow, making game action stutter and music stop and start. A fast CD ROM drive is therefore a must.

Here are a few of the most exciting games currently available on CD ROM:

LucasArts Entertainment has gone CD ROM in a big way. The multimedia edition of Loom, for instance, is really an interactive fantasy adventure film that unreels on your PC's screen. • ***$59.95 CD ROM version; LucasArts Entertainment; 800/782-7927. Reader service no. 623.*** **The Secret of Monkey Island is a charming Caribbean role-playing adventure that boasts an improved point-and-click interface in the CD ROM version. This CD's music track is exceptionally nice. •** ***$59.95 CD ROM Edition; LucasArts Entertainment, 800/782-7927. Reader service no. 624.*** **The Day of the Tentacle lets you switch between three fun-loving teenage protagonists. Sound effects, music, and a generous helping of witty spoken dialogue by a crew of professional actors add to the fun. •** ***$69.95 CD ROM version; LucasArts Entertainment; 800/782-7927. Reader service no. 625.***

The Chessmaster 3000 Multimedia Pro from The Software Toolworks plays at many skill levels. It also provides hints when you get in a tight spot—all with animation and sound. The CD ROM contains 10 classic games by world champion Anatoly Karpov, with spoken, play-by-play commentary and analysis from Karpov himself. • ***$79.95; Software Toolworks; 415/883-3000. Reader service no. 626.***

Sherlock Holmes Consulting Detective, from Icom, lets you match your wits against Conan Doyle's beloved fictional detective. The reason this game is found in the CD section is obvious once you start it up: Almost all of the clues and background information are found in lengthy, full-motion, professionally acted video and audio scenes. • ***$69.95 each volume; Icom Simulations; 708/520-4440. Reader service no. 627.***

—Michael Goodwin

Michael Goodwin is a contributing editor for PC World.

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Finally, to all our new and soon-to-be-new friends: We absolutely want you to be satisfied with your customized AMBRA system. If for any reason you're not, you can simply return it within 30 days for a full refund.[1,2] We're committed to delivering exactly the computer you want, exactly the way you want it, at a price that's only surprising in terms of its thriftiness. We build it your way. To meet your needs. And, if you're not happy, we'll give your money back.

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Memory	☐4MB ☐8MB ☐16MB ☐32MB ☐64MB
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MINITOWER (8x6)

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Memory	☐4MB ☐8MB ☐16MB ☐32MB ☐64MB
Hard disk	☐170MB ☐240MB ☐340MB ☐440MB

EISA DESKTOP (8x6)

Processor	☐486DX2, 66 MHz ☐Pentium, 60 MHz
Memory	☐8MB ☐16MB ☐32MB ☐64MB
Hard disk	☐170MB ☐240MB ☐340MB ☐440MB ☐540MB SCSI-2*

EISA TOWER (8x12)

Processor	☐486DX2, 66 MHz ☐Pentium, 60 MHz
Memory	☐8MB ☐16MB ☐32MB ☐64MB ☐Other ____MB
Hard disk	☐170MB ☐240MB ☐340MB ☐440MB ☐540MB SCSI-2

*Not available with 486DX2, 66 MHz processor.

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OPTIONS

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Graphics accelerator	☐ATI® Ultra Pro Graphics VL™
Printers & scanners	☐IBM Personal Printer II (24-pin) ☐IBM LaserPrinter 4039 (12 ppm) ☐IBM LaserPrinter 4029 (10 ppm, 6 ppm) ☐Caiera WS Complete PC Scanner

SOFTWARE

Word processing	☐Lotus Ami Pro ☐Microsoft Word® ☐WordPerfect
Accounting	☐Quicken
Spreadsheet	☐Microsoft Excel® ☐Lotus 1-2-3 ☐Quattro Pro
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- 14" SVGA LR color monitor
- Desktop casing (8 x 6; convertible to minitower)
- MS-DOS 6.0, Windows 3.1, mouse

$3,999

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[2] Return shipping and insurance charges are the responsibility of the customer.
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THE ANIMALS gives you a narrated trip to the zoo that includes thousands of wildlife photos, fascinating facts, guided tours, and video clips.

businesses, while **PhoneDisc USA Residential** gives you access to 80 million names, phone numbers, and addresses. **PhoneDisc Reverse**, a five-disk set, offers both sets of listings and lets you look up information using reverse indexes such as street address, phone number, or business type. The data is compiled by Database America, a mailing list company, so you won't find every number that's in your phone book there. All the products feature an auto-dialer and let you save or print up to 50 listings at a time. Quarterly updates are available at extra cost. USA Business and USA Residential list separately for $99 or bundled for $159; PhoneDisc Reverse costs $349. Digital Directory Assistance, 800/284-8353, 617/639-2900.

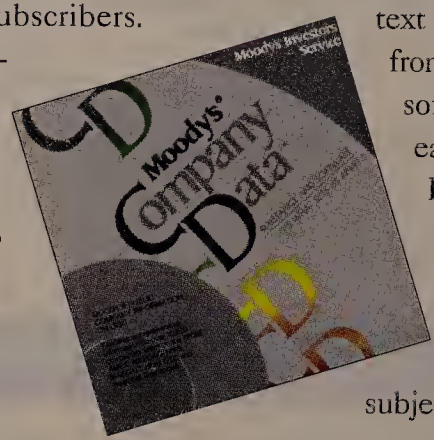
Reader service no. 612

Financial Facts on File

PLATFORM: *DOS*
SOUND BOARD: *not required*

Numbers, numbers, numbers. That's what **Moody's Company Data** provides in generous detail on 10,000 public companies. You just type in a company name, and you get page after page of financial data, including a summary of assets and liabilities, profitability, liquidity, and debt and asset management. For deeper analysis, you can review the company's annual income statement, balance sheet, and cash flow statement and a detailed history. You can rank companies or search for them using virtually any of the program's 140 fields, or you can customize your display and reports by selecting just the fields you're interested in. The software is extremely easy to use: You won't waste time reading manuals. And if your business is aimed outside the United States, there's **Moody's International Company Data**. Subscriptions, which include monthly or quarterly updates, cost $6000 for the national version and $7000 for the international version. Discounts are available for libraries and current Moody's subscribers. Both products use a copy-protection device that attaches to a parallel port. Moody's Investors Service, 800/955-8080, 212/553-0435.

Reader service no. 613



Bread-and-Butter Business Information

PLATFORM: *DOS*
SOUND BOARD: *not required*

If you want broad business data instead of Moody's deep financial reports, check **Dun's Million Dollar Disc**, which contains basic information on the top 200,000 public and private companies in the United States. For business prospecting, you can narrow a search by state, city, county, ZIP code, area code, Standard Industrial Classification (SIC) code, sales volume, or number of employees, or combine search fields for even more precise results. The disk, which costs $5295, also provides information on each company's key directors and includes brief biographies. For $3500, **Dun's Middle Market Disc** provides the same type of data on 150,000 of the next largest companies, and its $3500 **Service Market** CD ROM includes information on 200,000 public administration and service companies. All are updated quarterly. For a broader look at the marketplace, the $2650 **Dun's Business Locator** provides contact information—name, trade style, address, phone number, and type of business—on 11 million companies; it is updated twice a year. Dun & Bradstreet Information Services, 800/526-0651, 908/665-5000.

Reader service no. 614

Business News That's Fit to Print

PLATFORM: *DOS*
SOUND BOARD: *not required*

Here's my dream: to have an entire library of CD ROMs with the full text of every important newspaper in the United States. Dialog Information Services offers something close, at least for business news. The **Dialog OnDisc US Business Reporter**, for example, offers full-text business news articles culled from 16 major newspapers. The software is menu-driven and easy to use, and if you know Dialog's online service, you can query using the commands you're already familiar with. Either way, you can search by word, subject, publication date, newspaper name, state or region, headline, byline, ticker symbol, and so on. Dialog also offers many other CD ROM titles that use the same interface, including Standard & Poor's Corporations, Directory of US Importers and Exporters, Federal Register, MedLine, and many major newspapers. A subscription to Business Reporter costs $995 per year, which includes updates every two months. Dialog Information Services, 800/334-2564, 415/858-3785 (fax).

Reader service no. 615

Every Book in Print

PLATFORM: *DOS*
SOUND BOARD: *not required*

That well-thumbed reference book you see in every respectable bookstore, *Books in Print*, is a pleasure to navigate on CD ROM. I looked at **Books in Print with Book Reviews Plus,** which includes nearly 200,000 full-text reviews from publications such as *Publishers Weekly* and *Booklist*. You just type in a topic, scroll through the alphabetized subjects until you've narrowed them down sufficiently, and bingo! Your book list appears. You can choose to view the citations in short or long versions, save them to disk, or print them. Books in Print helps you create purchase orders, and if you install separate ordering software available from the book vendors, you can order books electronically. You can also purchase CD ROM versions of *Books Out of Print Plus*, *Ingram-Books in Print Plus*, and *Ingram-Books in Print Plus with Book Reviews Plus*. The CD version of Books in Print with Book Reviews Plus costs $1595 and includes monthly updates; Books in Print Plus is $1095. Reed Reference Publishing, 800/323-3288, 908/464-6800.

Reader service no. 616

Education and Entertainment

International Mystery Tour

PLATFORM: *DOS*
SOUND BOARD: *required*

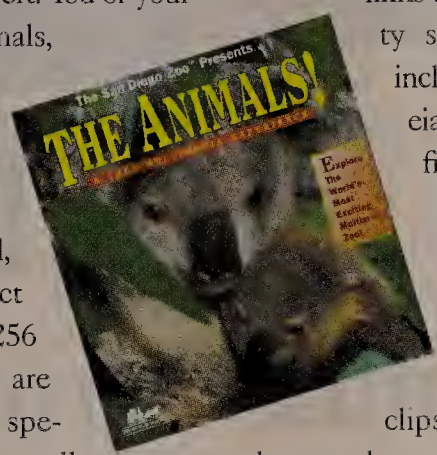
Hey, gumshoe! Get your kids on the trail of the world's most glamorous software villain with the CD ROM version of **Where in the World is Carmen Sandiego? Deluxe Edition.** Their mission: to track down Carmen Sandiego and members of her international crime syndicate. Their tools: an on-screen cellular phone, a crime dossier, copious clues, and most important, their ever-growing knowledge of world geography. Where in the World Is Carmen Sandiego? is one of those clever games that actually makes learning *fun*—you may find yourself borrowing it. Maps and statistics are always popping up, and you nab your villain by knowing the facts. If you're stumped, you can refer to the *1993 World Almanac*, which is included with the CD. This is also one of the few CD ROMs that packs in images, animations, and music but still manages to perform well. So don't just stand there. Find out who stole the secret remedy for Montezuma's revenge! List price is $59.95. Broderbund, 415/382-4400, 800/521-6263.

Reader service no. 617

Cavort With the Animals

PLATFORM: *Windows*
SOUND BOARD: *required*

The San Diego Zoo is a gigantic outdoor museum, and its disk comes as close as CD ROM can to making you feel like you're there. **The Animals** features a main menu laid out by animal habitats such as rain forest, tundra, and desert. You or your family can explore the animals, take a tour (there's even one narrated by a kid), visit the nursery, check out the library, or listen to a story. Wildlife pictures are plentiful, sharp, and clear (the product requires video support for 256 colors), and the audio clips are like miniature PBS animal specials. Multimedia links are well implemented among sections. This is a great disk for browsing with kids or planning a trip to the zoo. The Animals retails for $99.95. The Software Toolworks, 800/234-3088, 415/883-3000.



Reader service no. 618

Pass the Popcorn

PLATFORM: *Windows*
SOUND BOARD: *recommended*

I love flipping through movie guides, but sometimes I just want someone to point me to a four-star movie. Here's where **Microsoft Cinemania** wins hands down. Select the film genre and the star rating you're looking for, and the program issues a list of movies. You can also browse through some 19,000 capsule reviews from *Leonard Maltin's Movie and Video Guide 1992* (with an on-screen remote control) and nearly 700 longer reviews. The text is lively, well written, and full of hypertext links to related topics. High-quality stills and sound clips are included. Film buffs will appreciate the glossary, biographies, filmographies, and articles on related movie topics from Baseline's *Encyclopedia of Film*. The 1994 version, which will include additional full-motion video clips, excerpts from movie themes, the complete text of *Roger Ebert's Video Companion*, and selected reviews from Pauline Kael's *5001 Nights at the Movies*, should be available by the time you read this. List price is $79.95. Microsoft Corp., 800/426-9400, 206/882-8080.

Reader service no. 619

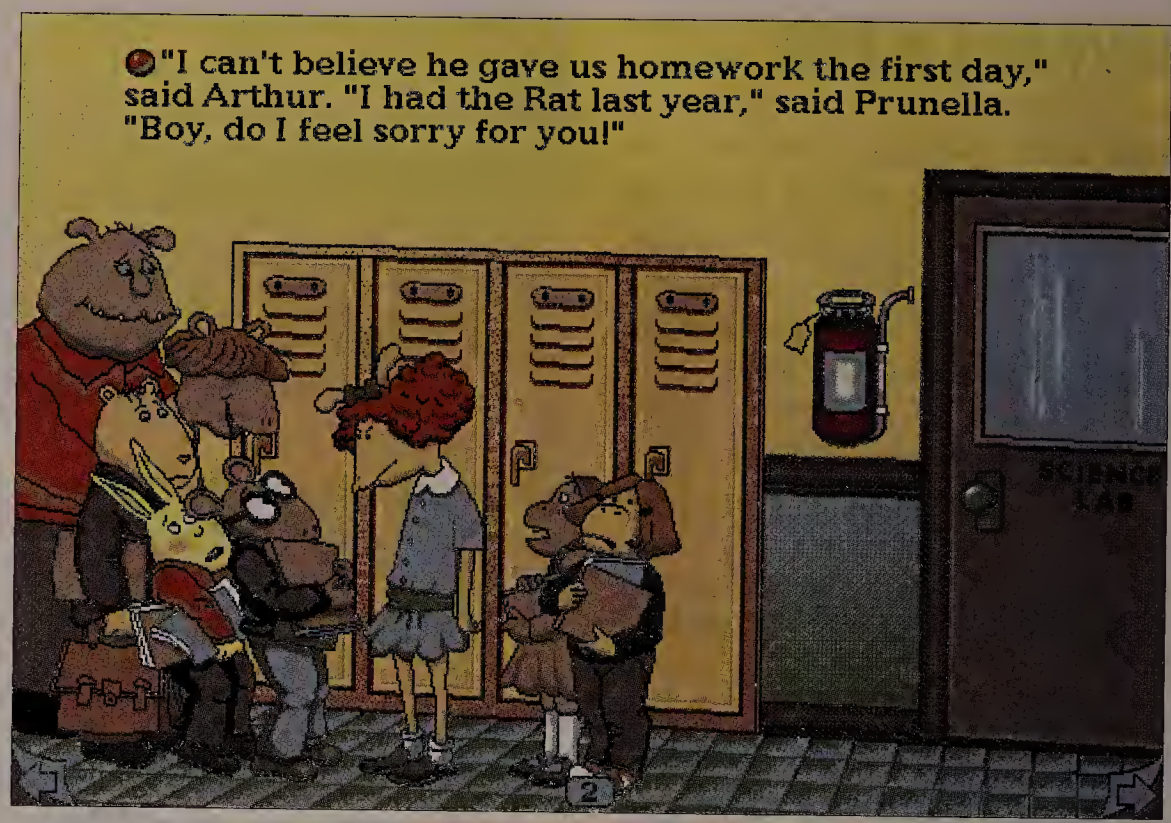
A MUST FOR FILM BUFFS, Cinemania lets you search on movie stills, sound bytes, portraits of stars, film genres, and even star ratings.

Parlez-Vous a Foreign Language?

PLATFORM: *Windows*
SOUND BOARD: *required*

I've studied French and Farsi, but once I leave the country where the language is spoken, my proficiency goes down the drain. Now you can stay in practice at home. HyperGlot's excellent **Berlitz Think and Talk** series can teach you Spanish, French, German, or Italian by immersing you in the language. In the first Spanish lesson, you see a picture of a clock, hear it strike, and listen to a native speaker counting *uno, dos, tres*. You don't need English to understand what's going on. After listening to the lesson, you can read it, type it on screen, check your answers, or do exercises. With a microphone and sound board, you can record your voice and check it against the lessons. The program runs on a 386SX, but I'd recommend a faster system. The series includes eight disks of 50 lessons and costs $199. HyperGlot Software, 615/558-8270, 615/558-6569 (fax).

Reader service no. 620



USER-FUNNY INTERFACE: Arthur's Teacher Troubles has some great hidden buttons. Click the briefcase, for example, to hear it belch—and excuse itself.

Music to Your Ears

PLATFORM: *Windows*
SOUND BOARD: *required*

Microsoft Musical Instruments is one of the most beautifully designed CDs I've ever seen. Each screen is laid out with the care you'd find in an art book, and the illustrations are crisp and detailed. You can search by instrument family, country of origin, or alphabetically. Each of the 200 instruments includes a sound clip, a fact box, a short description, and a drawing with captions identifying critical parts. Don't expect encyclopedic information, though: This disk is best at providing a brief introduction to the world's musical instruments. List price is $79.95. Microsoft Corp., 800/426-9400, 206/882-8080.

Reader service no. 621

WANT TO LEARN ABOUT WORLD MUSIC? Microsoft Musical Instruments includes sound clips and descriptions of more than 200 instruments.

Books That Come Alive for Kids

PLATFORM: *Windows*
SOUND BOARD: *required*

Broderbund's **Living Books** series is a labor of love, carefully crafted by a team of illustrators, animators, and sound designers. Based on two popular children's books, **Just Grandma and Me** by Mercer Mayer (for ages 3 to 8) and **Arthur's Teacher Trouble** by Mark Brown (for ages 6 to 10), the CD ROMs of the same name are funny, clever, and highly interactive, so kids can have fun exploring each page. Click on the roses in the garden, for example, and they burst into song; a poster metamorphoses into a paper airplane; an alarm bell hits itself on the head and sees stars. All this wizardry requires 4MB of RAM and video support for 256 colors. The third book in the series, **The Tortoise and the Hare,** is expected to have been released before you read this. The list price for these disks ranges from $39.95 to $49.95 and includes the original storybook. Broderbund, 415/382-4400, 800/521-6263.

Reader service no. 622

Anita Amirrezvani is a contributing editor for PC World. *She can be reached on PC World Online (see page 10 for contact information).*

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The Trick to Mastering Multimedia.

A family of audio boards that perform like magic.

There's a trick to getting the most from multimedia. It's MediaMagic™. Our full-family of audio boards and sound systems deliver high-quality sound and outperform the competition without their high price or difficult installation.

Introducing the ISP-16 Audio Board. $99

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The ISP-16 is big news for cost-conscious users. At just $99, you can buy two boards for the price of one Sound Blaster 16. And the features are identical. Both have 16-bit stereo sound, record and playback, 20-voice FM synthesis and CD-ROM interface. But only our ISP-16 supports popular Sony CD-ROM drives. Get our professional quality ISP-16 for a game-board price. Or upgrade to the ISP-16 Sound System, complete with CD-ROM drive, custom speakers and popular CD-ROM titles for hundreds less than our competition.

Enhance your multimedia experience with DSP-16 — For affordable, high-performance sound.

MediaMagic Digital Signal Processor (DSP) boards offer quality digital audio at affordable prices. You get 16-bit, 48kHz stereo, a CD-ROM interface and a joystick/MIDI port all in one package. Unlike other boards, the DSP-16 is compatible with AdLib, Sound Blaster, Business Audio, Windows Sound System and MPC-2. DSP-16 will also support future audio standards with a simple software upgrade while other boards just become obsolete.

DSP-16 SCSI and DSP-16 Plus – The ultimate in multimedia sound.

MediaMagic DSP-16 SCSI and DSP-16 Plus Audio Boards have all the features of the DSP-16 and more! Choose the DSP-16 Plus for MPEG II real-time data compression and WaveMagic, the wavetable MIDI synthesis professional musicians use. Or choose the affordable DSP-16 SCSI, and upgrade to WaveMagic with MPEG II later!

Products:	Digital Audio	Up-grades	Wave Table	CD ROM	Real-Time MPEG Audio	Price*
MediaMagic™ DSP-16 Plus	16-bit 48 Khz	Yes	Standard	SCSI	Yes (encode/ decode)	$259.00
Sound Blaster 16 ASP	16-bit 44 Khz	Yes	Expensive Upgrade	Propri-etary	No	$349.95
ProAudio Spectrum -16	16-bit 44 Khz	No	No	SCSI	No	$299.00

*Base SRP

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Circle 22 on reader service card

Two w
make a

If patience is a virtue, it would be tough to find anyone more virtuous than a 386 user.

Of course, you're not waiting to be canonized. You just want to get your spreadsheet crunched, printed and e-mailed before your boss's boss calls you looking for it.

Now if you had a 486, you wouldn't have this problem. But all that wishful thinking goes out the window when you consider the double-knots on your company's purse strings.

Performance Benchmarks		
(figures indicate relative performance)	Intel i386	Cyrix 486 Upgrade
MS Excel 3.0	1.0x	2.1x
MS Word 2.0	1.0x	2.8x
Micrografx Designer 3.1	1.0x	2.6x
Benchmark tests run on IBM PS/2 Model 70/20MHz		

The new Cyrix 386-to-486 Upgrade Microprocessor delivers application performance that's twice as fast. And that's twice as smart.

Fortunately, there's a smarter alternative to the downward migration path pictured above. It's called the 386-to-486 Upgrade Microprocessor.™ And it's only available from Cyrix,® the smarter microprocessor company.

It's smarter because it's the only single-chip upgrade solution of its kind. And as such, the most cost-conscious way to replace the pedestrian 386 computer you have, with the searing 486 power you want.

Our upgrade chip acts just like a 486, and with good reason. It has Clock Doubling, a 1K on-chip cache

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ays to 386 fly.

Now available for 386SX models!

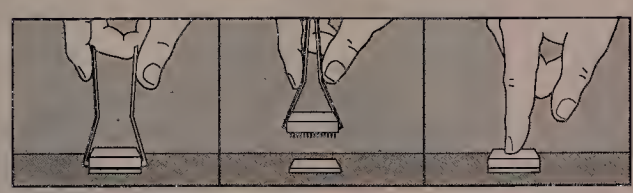
and enhanced Cx486 technology. Which means it delivers *twice* the application performance, and 100 percent compatibility with all your software.

MICROSOFT WINDOWS COMPATIBLE

yes It runs with NetWare

Like DOS, Windows and OS/2. Even Windows NT. It's also certified software compatible in Novell, Banyan and Lan Manager nodes.

What's more, it's easy to install (it takes all of 15 minutes), and costs under $400. So it's also easy to justify to even the stingiest bean counters.



Here's how to get an instant 486. Just use the chip removal tool provided to pull out your 386DX chip (16, 20, and 25 MHz versions), and plug our Cyrix Upgrade Microprocessor into the empty socket. Installing the SX version is even easier. It just clips on over the existing chip.

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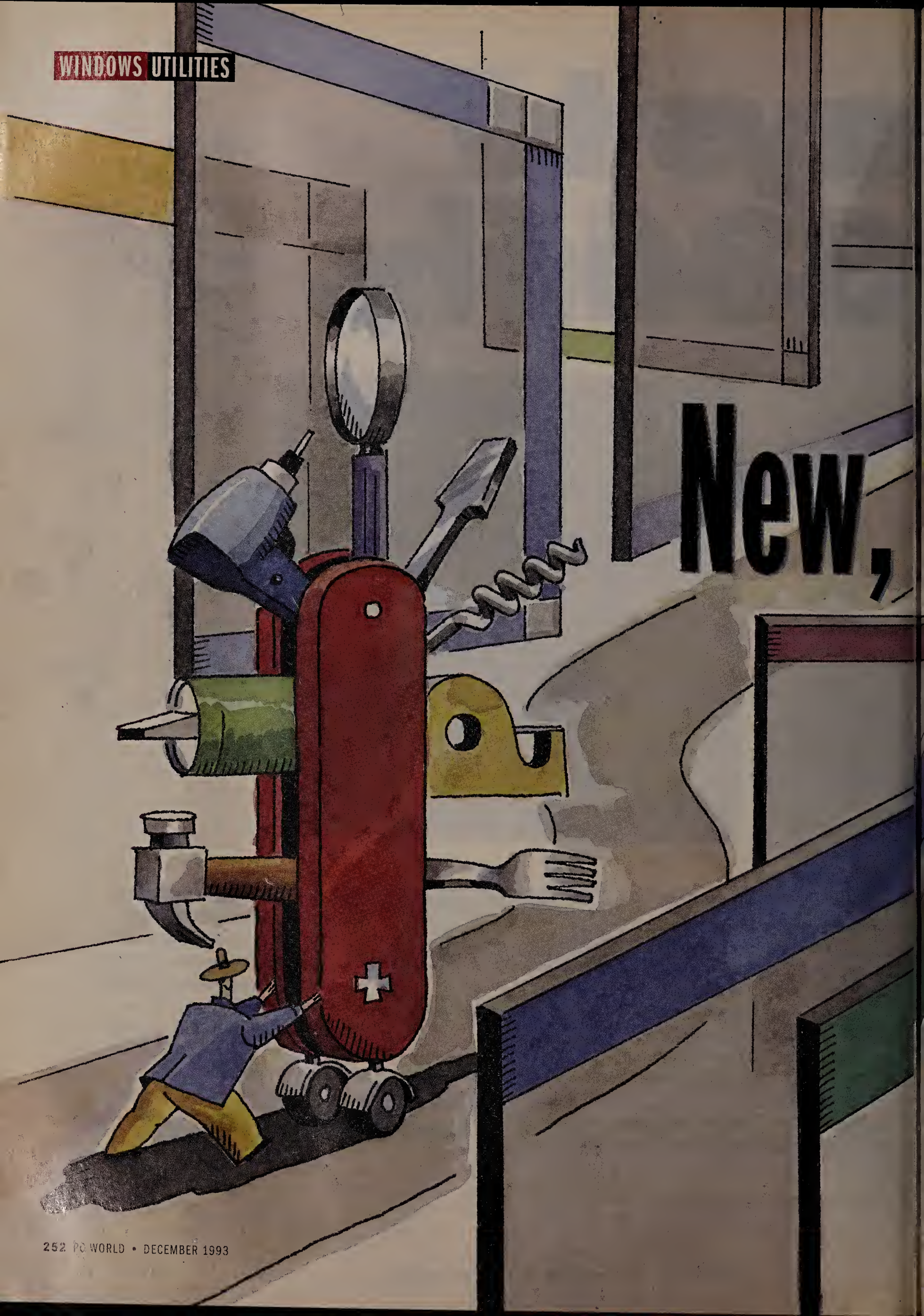

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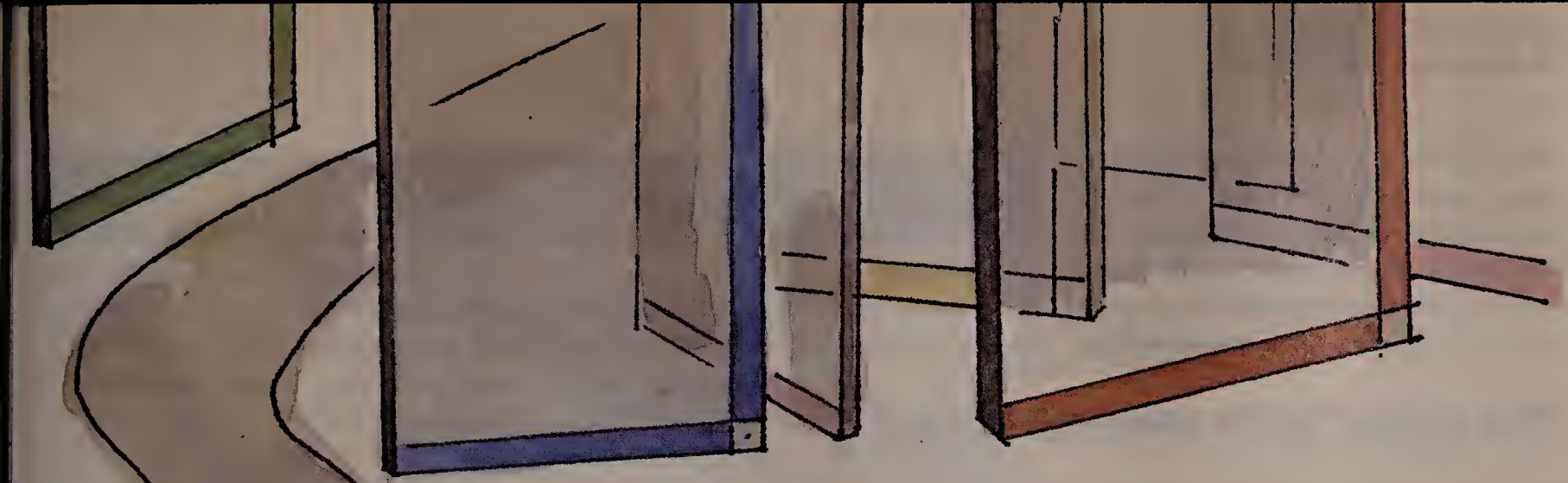


Granted, they're not Windows 4.0, but these 40 low-cost utilities let you add or subtract from Windows to make it work the way you want.

Improved Windows

ILLUSTRATIONS: ROBIN JAREAUX

Face it. Many of us have a love/hate relationship with Windows. Users have picked up on Windows' inherent advantages, such as task switching, Dynamic Data Exchange (DDE), and Object Linking and Embedding (OLE). And Windows programs are by and large much easier to use than DOS-only products. With Windows popping up everywhere, you probably can't get along very well without it. But on its own, this graphical juggernaut still doesn't offer the adaptability for everyone to achieve a comfortable fit. For example, you might want greater file and print manageability or just the capability to task switch without dealing with the Windows desktop. Windows' new world order leaves many of us longing for more—or less. This dissatisfaction (and downright dislike on the part of many DOS veterans) has spawned a red-hot market in Windows utilities: those handy software add-ins that extend and expand Windows or—if you prefer—just get the Windows look and feel out of your face.

As we quickly found when we started putting this article together, the number of Windows utilities available is mind-boggling. There are literally hundreds, in scores of categories. Miniature mountains of packages altered the landscape of our office (complete with occasional box avalanches). Mapping out the

Research by John Goddard

By Anne Fischer Lent and Stan Miastkowski

whole utilities terrain would require a long book. And *PC World* has recently covered all-in-one collections (such as Central Point PC Tools for Windows and Symantec's Norton Desktop for Windows), virtual desktops, File Manager replacements, backup software, file and disk compression utilities, and security and antivirus utilities. While none of these are covered here, don't worry—we'll continue to keep you up to speed on these and other utilities.

These programs, from the indispensable UnInstaller to the always-entertaining screen savers, will help customize Windows to work the way you want it to.

Windows Essentials

We finally settled on 40 Windows utilities selected in large part from five major categories: desktop cosmetics, DOS in Windows, file and text finders, printing utilities, and screen capture and graphics manipulation products. The desktop cosmetics utilities are included mostly for fun and aesthetics, although the everyday usefulness of some may surprise you. DOS in Windows products are mostly for DOS stalwarts who want the advantage of multiple applications and task-switching under Windows. As suggested by their category, file and text finders are lifesavers when all you can remember from a forgotten file is a text snippet. And printing utilities add capabilities where Print Manager falls short. Why mention screen capture and graphics manipulation products? Because you can use them to pull off handy tricks such as grabbing a graph and placing it in a report to your business manager.

In addition, we added two singular products: Microsoft's Windows Resource Kit provides the critical documentation power users need, along with some useful utilities. Another one-of-a-kind, a category unto itself, MicroHelp's UnInstaller gets rid of the extensive debris discarded applications leave behind in your Windows system files.

To fill out our collection of Windows essentials, we also packaged some other bonus utilities in our "Short and Sweet" box. These products may be square pegs when it comes to fitting into predefined categories, but they often fill an individual need. Finally, we give our personal top seven Windows list in "Utilities You Can't Live Without."

In consideration of your bottom line, we have favored inexpensive utilities. And you can download any of the freeware or shareware products in this article from PC World Online for a free trial. (See "Shareware Connection" for additional contact information.) Just remember that if you wind up keeping a shareware application, it's your moral and legal obligation to send in the registration fee. Any of these programs—from the indispensable UnInstaller to the ever-entertaining screen savers—can help customize Windows to work the way you want it to.

Desktop Cosmetics

Since we spend so much time working with our PCs, desktop look and feel is an increasing priority. Windows, better graphics cards, and higher-resolution monitors have raised our expectations of what we see on screen.

In the not-so-good old days of monochrome monitors, we needed to keep static images from burning into our screen phosphors during periods of inactivity. Fortunately, the phosphors used in today's color monitors are (almost) immune to burn-in. And the coming generation of Energy Star displays will virtually shut down the monitor during periods of inactivity.

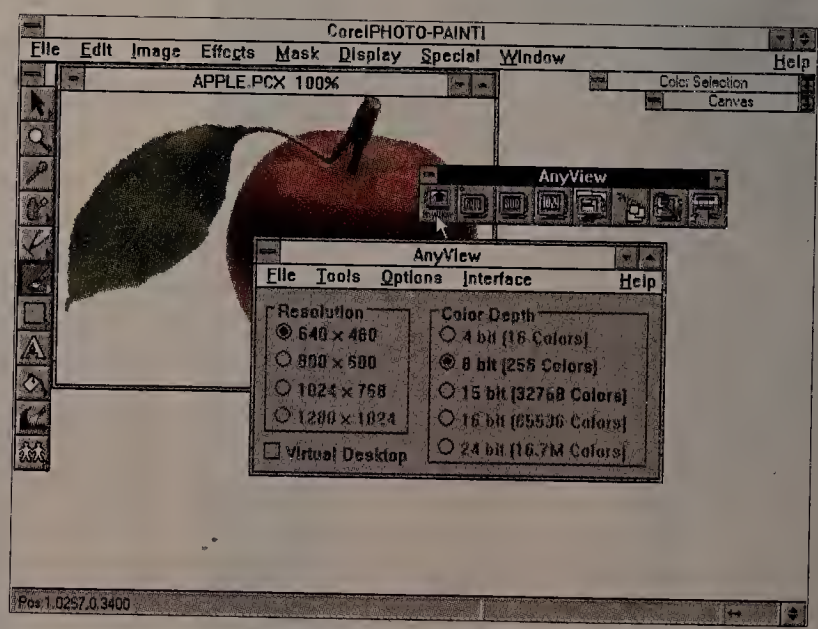
But screen savers of all sorts have achieved an incredible following—probably because flying toasters, fractals, Disney characters, and a welter of other images have become a familiar and welcome reprieve from the workaday world. So even with the Energy Star rising, Berkeley Systems and others will probably make sure an entertaining interlude precedes nap time for our new monitors. Remember, there are many more screen savers out there than we can cover in this review, so keep your eyes peeled for new programs.

If you're not a screen saver fan, we've also included some other utilities you'll probably like: products that allow you to switch screen resolutions on the fly, for example, or that provide a scrollable desktop.

AnyView 1.0

Different Windows applications work best at different screen resolutions. For example, you'll probably use a communications program, such as Terminal, at standard 640 by 480 VGA resolution. On the other hand, if you're reviewing a large spreadsheet or working with a desktop publishing program, 800 by 600 or even 1024 by 768 resolution will give you the big picture at a glance (assuming you have a monitor large enough to make higher resolutions practical). AnyView lets you change screen resolutions on the fly without rebooting, and you can even associate specific applications with specific resolutions.

You'll need a graphics card capable of 1024 by 768 resolution and a matching monitor to take full advantage of AnyView. The program works with most current graphics cards and chips (but check compatibility before you buy). AnyView's talents don't stop there; it provides a virtual desktop that's larger than what you see on screen. Just move the mouse pointer to the edge of the screen, and the display will scroll to reveal the hidden portion. Or use the Zoom mode to magnify a section of the screen. Finally, there's a DPI Wizard that lets you adjust your display so an inch on the screen equals an inch on the printer,



WITH ANYVIEW, CHANGING WINDOWS screen resolutions—on the fly—is as easy as pointing and shooting.

Utilities You Can't Live Without

Everyone has Windows utilities favorites, and we're no exception. Of the 40 we cover, here are our personal picks. We don't leave DOS without them.

Firefly Software Systems EDOS At least half of us still run DOS applications from within Windows. EDOS lets you start DOS and Windows applications from the DOS prompt, while minimizing DOS programs' memory use and maximizing Windows resources. List price: $69.95. Firefly Software Systems Corp., 800/248-0809, 503/643-8396. Reader service no. 654

Cognitronix Searcher Professional for Windows 2.0 Forges beyond its text- and file-search competitors with sophisticated Boolean search functions and ZIP file support. List price: $59.95 Cognitronix, 800/217-0932. Reader service no. 660

LaserTools PrintCache 3.1 This $99.95 utility (about half that price on the street) shows up Windows' Print Manager for the slug it is, eliminating thumb-twiddling waits and bottlenecks. List price: $99.95. LaserTools Corp., 800/767-8004, 510/420-8777. Reader service no. 664

Inset Systems HiJaak Pro 2.0 In our book, this is still the best and most versatile screen capture utility, graphics tool set, and image librarian. List price: $169. Inset Systems, 800/374-6738. 203/740-2400. Reader service no. 668

MicroHelp UnInstaller 1.11 Every Windows user needs to get rid of unneeded programs. The UnInstaller makes this chore a snap. List price: $79. MicroHelp, 800/922-3383, 404/516-0899. Reader service no. 670

Microsoft Windows Resource Kit Comes with five handy utilities, but over 500 pages of detailed documentation make this package a must for power users. List price: $19.95. Microsoft Corp., 206/882-8080, 206/936-7329 (fax). Reader service no. 671

Hewlett-Packard Dashboard for Windows 2.0 A customizable floating dashboard gives you quick and easy control over Windows applications and resources. Even includes a DOS and Windows command line. List price: $99. Hewlett-Packard, 800/554-1305, 408/720-3441. Reader service no. 674

giving you perfect WYSIWYG. List price: $99.95. Binar Graphics, 800/228-0666, 415/491-4182. Reader service no. 644

More Windows 3.0

This is a utility you don't think you need until you use it: From that moment on, you won't be able to get along without it. It goes beyond AnyView's enlarged virtual desktop to give you an extended screen in all Windows applications. Just bump the edge of the Window with your mouse pointer and then scroll out to view more territory. More Windows modifies your SYSTEM.INI file by substituting its driver for the Windows VGA driver, fooling Windows into seeing more pixels and resulting in a working screen of up to 1024 by 1024 pixels. List price: $99. AristoSoft, 800/338-2629, 510/426-5355. Reader service no. 645

DeltaPoint Animated Desktop 1.04

Animated Desktop livens up pedestrian Windows icons. Personalize your Windows desktop with more than 50 sounds, 150 icon and cursor animations, and 500 extra icons. You also get paint tools for designing icons and cursors. We particularly liked the 10 wallpaper images from classic movie posters. There's nothing like having The Duke watching over your desktop. List price: $59.95. DeltaPoint, 800/446-6955, 408/648-4000. Reader service no. 646

Icon Do-It, Hear-It, and Make-It

Like Animated Desktop for Windows, Icon Do-It, Hear-It, and Make-It let you fiddle with your Windows icons to your heart's content. Icon Do-It includes more than 200 icons, 25 of which are animated. You also get more than 50 mouse cursors, 10 of which are animated. Also, Icon Do-It includes four screen savers.

Icon Hear-It is a collection of sounds you can connect to any Windows event, dialog box, push button, or icon. You also get a talking Solitaire game, a calculator that voices its numbers and operations, and a timekeeper that announces the hour and minute at chosen intervals. You'll need a sound card to take full advantage of Hear-It, but it comes with a driver for your PC's internal speaker if you can live with tinny tones.

Icon Make-It enables you to create your own icons, and it comes with a 200-piece icon clip file with a set of drawing tools and special effects. List prices: Do-It $19.95, Hear-It $49.95, Make-It $69.95. Moon Valley Software, 800/473-5509, 602/375-9502. Reader service no. 647

Cursorific Professional 3.0

If you use a portable computer regularly, you know how hard it is to find the little cursor hiding coyly on your crowded Windows desktop—especially if you have a monochrome display. With Cursorific Professional you get over 60 animated cursors and 400 cursor images. You can also draw your own cursor or copy one from a favorite application using the EXE/DLL extractor. Your cursor will bounce and glide, if you like, and you control every frame in your animation. Or you can use the mouseless utility to turn your keyboard into a virtual mouse. Other included utilities customize the shape and color of the cursor. List price: $49. AApex Software Corp., 800/728-7650, 702/324-4580. Reader service no. 648

ArtScreens 1.5.1

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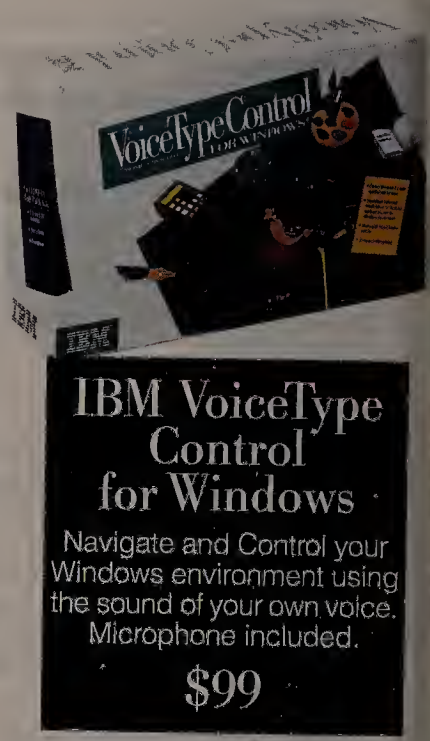

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masterpieces from the thirteenth to twentieth centuries. The masterworks present an attractive array ranging from Leonardo da Vinci's *Mona Lisa* to Picasso's *Portrait of Dora Maar.* By default, you get a circulating slide show arranged in chronological order. You can also set the art to show randomly, and you can set the length of time that images stay on screen. To see anything close to the quality of the artist's original, however, you'll need a graphics subsystem and drivers that support at least 256 colors.

A LOT OF SEEMINGLY SERIOUS BUSINESS TYPES have Berkeley Systems' Boris the Cat cavorting about the screen.

The color quality and resolution are excellent, making this a far more sophisticated screen saver than many. You can save individual images to use as Windows wallpaper, and Trident even throws in an informative little booklet that gives brief biographies of each artist. Furthermore, Trident Software plans to release collections concentrating on specific periods and styles. List price: $49.95. Trident Software, 703/761-6165, 703/356-9583 (fax). **Reader service no. 649**

More After Dark

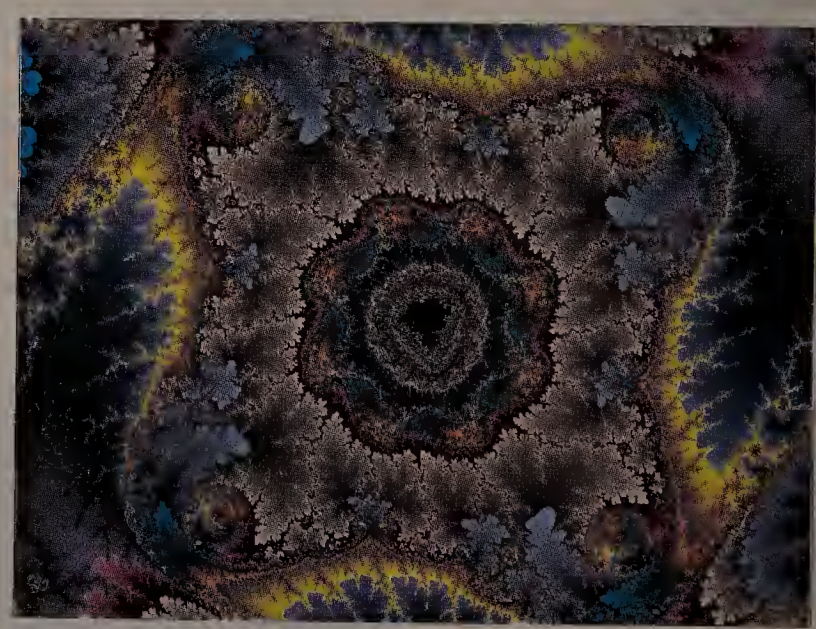
After Dark got its start on the Macintosh and then moved to Windows. The original package's flying toasters have now become a screen saver cliché. But just when you thought you'd had enough, along comes More After Dark, an add-on to the original. It features more than 25 new, off-the-wall displays with sound. For example, the Origami module simulates the art of paper folding, and the Bulge display makes your screen look as if it has dents and bulges. Berkeley Systems includes the winners of the 1990 and 1992 After Dark Display Contests, among them Mowin' Man and Tunnel. In addition, you'll find a space game called Lunatic Fringe, a Boris the Cat display, and a fractal geometry tree-shape generator. To run More After Dark, you will need to have After Dark 2.0 or later installed. After Dark's screen savers look as if they were designed by beings from some other reality, but they're constantly entertaining—and always surprising. List price: $39.95 (After Dark 2.0 lists for $49.95). Berkeley Systems, 800/344-5541, 510/540-5535. **Reader service no. 650**

Microsoft Scenes

Microsoft's new screen saver collection includes masterpieces from the Impressionist era, environmental scenes from the Sierra Club, and even images from outer space. The Impressionists Collection gives you paintings from fine artists such as Monet and Cézanne. The Sierra Club Collection pairs each photograph with an inspirational passage from the writings of naturalist John Muir. And the Outer Space Collection contains photographic images of the Moon, Earth, and Halley's comet. You can choose the way images move across the screen and change their duration. You can even use the Microsoft Scenes Wizards to incorporate bit-mapped Windows images into your scenes. Scenes is optimized for use at 640 by 480 resolution. List price: $29.95 for each title. Microsoft Corp., 800/426-9400, 206/882-8080. **Reader service no. 651**

A Touch of Chaos

If cute kittens, flying appliances, and fine art aren't your thing, you may go for the fascinating fractal images in A Touch of Chaos. This program—it's based on chaos science—creates an ever-changing, seemingly infinite flow of fractals. You also get various sounds of nature, which work in unison with the random and fluidly changing screen colors. You'll need a sound card, however. Bourbaki claims that A Touch of Chaos is "guaranteed to reduce productivity." That's between you and your boss—but with the dazzling beauty of irregularities of nature, A Touch of Chaos can keep your eyes glued to the screen. List price: $39. Bourbaki, 800/289-1347, 208/342-5849. **Reader service no. 652**



TIRED OF ORDINARY SCREEN SAVERS? A Touch of Chaos will spin you a seemingly infinite number of mind-bending fractals.

DOS in Windows

Marketing hype to the contrary, plenty of us still use DOS applications. Windows' DDE and OLE don't always make up for the effortless expertise we've accumulated over the years with our trusty DOS spreadsheets and word processors. As with comfortable old shoes, we are loath to junk them—especially when they still do such a good job. But even the most inveterate DOS curmudgeon can take advantage of Windows multitasking, keeping a few DOS applications running and using <Alt>-<Tab> or a hot key to move between them.

Running a mixture of DOS and Windows applications is great as long as your system doesn't run low on memory. Windows uses Program Information Files (PIFs) to know how much memory your DOS programs need. DOS applications may come with a preconfigured PIF. If not, Windows will use its default PIF and settings every time you start the application under Windows. Chances are the defaults will allot more memory than necessary to some programs. So if you're running multiple DOS applications under Windows, your task-switching speed can slow **continued on page 263**

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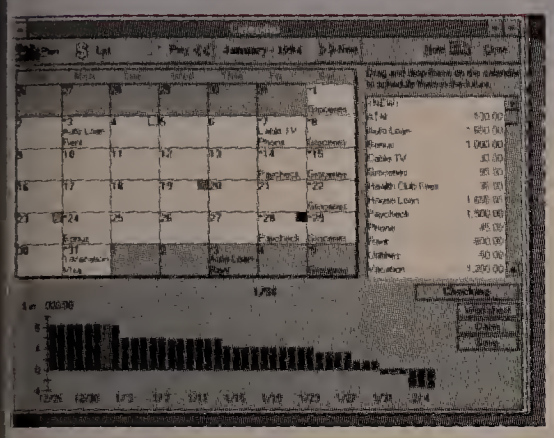

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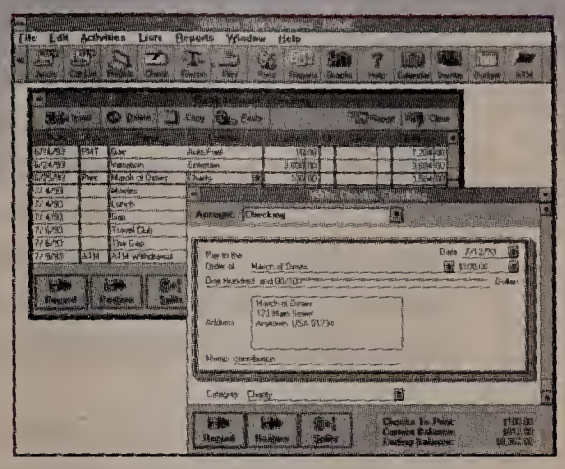

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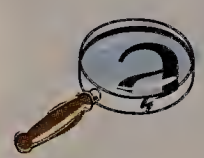
Trapped In The Body Of This Tiny Se

This is a story about a small computer engineered to be so dependable, you won't think twice about trusting it with your mission-critical applications. And to be this without filling a closet, much less a room. If you haven't thought of Compaq as an enterprise-critical platform before, we invite you to grab your bifocals and begin. (We'll be cramming a lot of information into this ad, which, given how much we managed to fit into our new servers, only makes sense.)



If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which makes the introduction of the new Compaq ProLiant Server even more timely.

The ProLiant is a new family of affordable, high-performance, easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

Now, how can you be sure our server is truly a miracle and not a mirage? To begin with, there's Full Spectrum Fault Management, provided by Compaq Insight Manager technology and software that continually monitors over 800 aspects of the server's operating status. (For example, Drive Parameter Tracking checks 15 hard-drive parameters.) All of this information is constantly gathered, analyzed and then used to prevent, tolerate or recover from system problems.

If the performance of a monitored component drops below a specified level, our unique Pre-Failure Warranty kicks in. We'll actually replace a Compaq warranted drive or memory system free. Before it stops working. No downtime. Ringing cash registers. Happy boss.*

Still, no network's perfect. In the unlikely event problems occur, our server exhibits remarkable tolerance. Every ProLiant includes Compaq-designed hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

ER IS A MAINFRAME WITH AN ATTITUDE.

For example, Automatic Server Recovery 2 uses a historical record of server status and performance to perform an astonishing array of tasks. Like intelligently restarting the server, automatically correcting a variety of problems, and accessing a telephone pager to contact network administrators.

By now you'd expect us to have rethought server setup, configuration and OS installation, but you might be surprised by the results. Introducing SmartStart, a CD-ROM system that takes the headache out of getting your server up and running. ProLiant includes a CD-ROM drive and bundled CDs of optimized Netware and other major operating systems. To get hooked up to your network operating system, simply call your dealer for an access code, enter it, answer a few questions, and leave. Minutes later—say, after you've enjoyed a cup of coffee and a jelly donut—you'll return to find an integrated OS fully installed and optimized for increased performance and improved management. And we'll keep you updated via CD when new operating system versions appear.

*And finally, to accompany our new line of mission-critical servers, we're introducing mission-critical support. With ProLiant, we now offer extensive analysis, installation and service through our CompaqCare System Partners, a select group of highly trained systems experts backed by Compaq engineers. You can now choose 4-hour on-site warranty response upgrade** direct from Compaq. Again, there's our unique Pre-Failure Warranty. And, of course, all Compaq servers come with a 3-year on-site† warranty, and 7-day-a-week, 24-hour-a-day technical support.*

All in a surprisingly small box for not a whole lot of money. In fact, a DX2/66 Compaq ProLiant 1000 starts at about $6000‡.

Which may help to explain the look your boss gives you when he hears how much money you've saved: stunned admiration. But you'll get used to that. It goes with the territory. For more information on the new Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you, just call us at 1-800-345-1518. If you'd like to receive model, feature and specification information immediately via fax, select the PaqFax option. Or, if you'd like that information even sooner, just turn the page.

COMPAQ

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The New Compaq ProLiant Mission-Critical Servers

	ProLiant 1000	ProLiant 2000	ProLiant 4000
High Performance Network Servers			
Processor	Intel 486DX2/66 or Pentium 60MHz	Intel 486DX/50 or Pentium 66MHz	Intel 486DX/50 or Pentium 66MHz
Architecture	TriFlex/PC One Processor	TriFlex with up to two symmetric processors	TriFlex with up to four symmetric processors
Network Interface	Up to 12 High-Speed Channels; NetFlex 2 with Packet Blaster Technology Standard		
Standard Disk Controller	Integrated Fast SCSI-2 and Smart SCSI Array Controller (selected models)		
Storage Capacity	550MB–112GB Internal/external	1050MB–140GB Internal/external	1050MB–140GB Internal/external
Typical Usage	Departmental network services—primarily NetWare	Departmental network application services—NetWare, NT and Unix	Application services for preemptive downsizing—NT and Unix
Transaction Rating	50–150 TPS	200–300 TPS	300–400 TPS
Estimated Starting Street Price‡	$6,000	$8,900	$13,900
Server Dependability and Availability			
Management	Second-generation Compaq Insight Manager (standard) combines with innovative hardware design to constantly monitor, assess and report server health and performance		
Fault Prevention	Insight Manager alerts you to server status changes in over 800 component parameters, allowing proactive server management backed by 3-Year Pre-Failure Warranty		
Fault Tolerance	Standard support for RAID levels 1,4,5; hot-pluggable drives; on-line spare drive; off-line backup processor§; advanced ECC RAM§		
Fault Recovery	Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure		
Simplicity, Ease of Ownership and Support			
SmartStart	Standard CD-based intelligent hardware configuration and system software installation, providing simplified server configuration for NetWare, NT or Unix. (CD-ROM drive standard)		
System Warranty	Free Three-Year, On-Site Limited Warranty		
Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds		
4-Hour Warranty Response Upgrade	Optional Three-Year On-Site Warranty upgrade to 4-hour response		
Technical Support	Toll-free, 7 x 24 technical phone support from Compaq engineers		
CompaqCare System Partners	Highly trained, dedicated, third-party professionals who provide systems maintenance and comprehensive technical support		
QuickFind/PaqFax	Proactive notification and delivery of new technical information/7 x 24 fax response for updated specification, configuration and settings data		

COMPAQ

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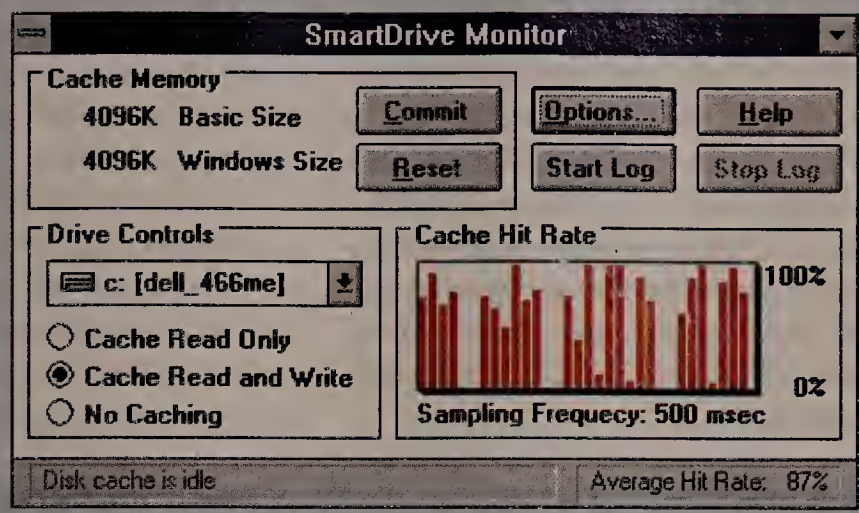
dramatically as you run out of RAM and Windows starts using relatively sluggish virtual memory. These and other limitations have spawned a variety of utilities for running DOS programs under Windows.

Windows Resource Kit

Looking for a real deal? At $19.95, Microsoft's Windows Resource Kit is almost a steal. Although it comes with a disk, the real centerpiece of the kit is over 500 pages of documentation that tell you virtually everything you ever wanted to know about Windows. A look at the Resource Kit's manual will convince you of the flimsiness of the documentation that comes with Windows 3.1. It's all here: the detailed information you've been wishing for on configuring Windows, working with specific applications, memory management, PIFs, fonts, networks, and—best of all—detailed sections on troubleshooting. And if you've ever wondered what all those settings in your WIN.INI and SYSTEM.INI files mean, even they are spelled out. For power users, the Resource Kit provides the missing pieces of the Windows puzzle.

Also included are five handy utilities. There's a graphical monitor for the SmartDrive disk cache and the SysMeter representation of user, graphics, and RAM resources. In addition, you get a BMP, ICO, and WMF graphics-file viewer, along with TopDesk, a virtual-desktop utility. Finally, there's Network Assistant for managing and viewing network connections. There's also a kit for Windows for Workgroups users. For $29.95, you get an even larger book and more network-specific utilities. Microsoft Corp., 206/882-8080, 206/936-7329 (fax). Reader service no. 671



WANT TO KNOW WHAT'S GOING ON with SmartDrive? The Windows Resource Kit gives you a handy monitor.

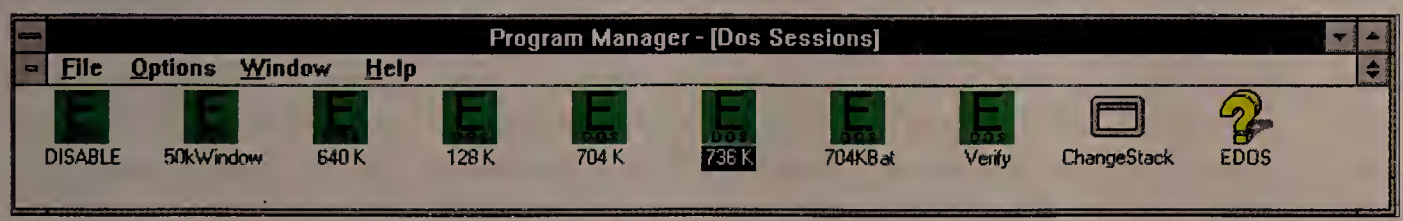
DOS for Windows 2.0

Landmark Research International—best known for its benchmark and diagnostic programs—recently purchased Impostor, a popular freeware utility designed for DOS command-line fans using Windows. Landmark's DOS for Windows 2.0 isn't free, but it is improved and debugged.

DOS for Windows' strong suit is memory management, which makes it easier for you to run multiple DOS applications without gorging on memory. Windows can even borrow memory from DOS if need be. Impostor is a singularly appropriate name for the program because it's actually a Windows application that mimics DOS's COMMAND.COM. If you're a dyed-in-the-wool DOS veteran, you won't mind a bit, for this facility enables you to run both DOS and Windows applications from the familiar DOS prompt. You can also associate data files with both Windows and DOS applications, and you can even run batch files that contain both DOS and Windows commands. List price: $69. Landmark Research Int'l Corp., 800/683-6696, 813/443-1331. **Reader service no. 653**

EDOS 3.70e

EDOS (Enhanced DOS for Windows) is the most ambitious of the DOS in Windows utilities covered here. This device driver works full-time in Windows, delivering a spectrum of unique DOS-related features. EDOS gives you access to five sizes of DOS sessions: 50K, 128K, 640K, 704K, and 736K. Using the smallest DOS session that your application needs improves performance, keeping you computing at full speed while running a passel of DOS programs. Each EDOS session has its own Windows-like menu bar with pulldown menus. And EDOS offers unusual control over individual DOS sessions, including the capability to fine-tune PIFs on the fly. For serious DOS in Windows users, EDOS offers the most features and control by far. On the downside, it will take users some time to get a handle on all its capabilities. List price: $69.95. Firefly Software Systems Corp., 800/248-0809, 503/643-8396 (BBS). **Reader service no. 654**



EDOS GIVES YOU MULTIPLE OPTIONS for running DOS from within Windows—tailored to fit your application.

WinCLI Pro

CLI stands for *command line interface*, and WinCLI Pro adds a lean C> prompt to Windows, taking up just 60K of RAM. As with Landmark Research's DOS for Windows 2.0, you can run DOS or Windows applications from the command line. The program comes with full Clipboard support, a detailed help system, command line editing, command history, and command aliases (such as DOSKEY in DOS 5.0), along with a scroll-back buffer. A shareware version that has fewer features is available for $35. List price: $79.95. Eschalon Development, 604/520-1543 (voice and fax). **Reader service no. 655**

Transom 1.4

If you wish your DOS programs could use Windows' Clipboard, fonts, and print spooling, check out Transom. This utility turns all your DOS applications into pseudo-Windows applications, allowing them to use

Windows' TrueType fonts, easily import data from the Windows Clipboard, and also print through Print Manager (although only with Hewlett-Packard LaserJet drivers). Transom works with virtually any DOS application. Your lunch isn't entirely free, however, as Transom doesn't work as seamlessly as Windows applications: You have to use a preview mode to see how TrueType fonts will look. Still, Transom gives you a great way to broaden the capabilities of your DOS favorites. List price: $49.95. Metro Software, 800/697-6971, 602/292-0313. **Reader service no. 656**

File and Text Finders

Windows 3.0's File Manager earned a bad reputation that has stuck through Windows 3.1's improvements. Sure, you can now list files alphabetically as well as by date, type, or size. But that just isn't enough for many of us, especially when we need to find a file and can't remember its name. Knowing a text string from the file doesn't help either, as Windows File Manager doesn't have text-search capabilities. Fortunately, capable add-ons are available, some of which are found in all-in-one super utilities collections, such as Central Point's PC Tools for Windows. The handful of file and text retrievers we've chosen to list in this roundup cost considerably less; some are available for as little as $15.

Hunter

✓SHAREWARE This file and text finder allows you to search multiple drives and directories for file names that match your specifications, even including creation date or size. Hunter returns the search results with speed and precision. Once you find what you're looking for, you can launch an executable file or an associated document by

Short and Sweet

The individual holes in the Windows bucket have been patched by a slew of interesting, unique, and occasionally indispensable utilities. This sampling doesn't neatly fit our other categories (as is the tendency of some of the most interesting applications), but these 12 eclectic picks address individual needs and can help you make the most of your Windows setup.

DASHBOARD 2.0'S FLOATING TOOL BAR provides easy access to applications and puts you in the Windows driver's seat.

BailOut

✓FREEWARE If you'd like to shut down without running into Windows' confirmation prompt, BailOut is the utility for you. A must for users who want a quick way out. Registration fee: none. Dick Bryant, CIS: 75236,3243.

CmdLine

✓SHAREWARE If you're most comfortable working at a command line, you may get tired of Windows' file, open, browse, and select convention for opening files in applications. CmdLine will give you relief by providing a command line prompt as soon as you start your application. Enter the path and name of the data file you want, and away you go. Registration fee: $10. CIS: 72527,574.

Dashboard for Windows 2.0

This popular push-button panel can float anywhere on your Windows desktop. It lets you control all your Windows applications and resources with just the press of a button, launching programs and keeping track of your resources through its graphical gauges and information windows. New with version 2.0 is the capability to size the dashboard vertically and horizontally.DOS fans take note: File management options now include a DOS command line. And Dashboard helps you customize fonts and colors and set up hot keys you can use for changing Dashboard settings or launching favorite applications. You can place Dashboard's Snap-Off Toolbars anywhere on screen. There are also new clock and calendar alarm options, and you can display system resources in a variety of ways. If you like, you can even replace Windows' Task Manager with Dashboard. List price: $99. Hewlett-Packard, 800/554-1305, 408/720-3441. Reader service no. 674

Fantastic Recall

Any Windows fan can increase productivity with this one. Every time you launch Windows, Fantastic Recall brings you right back to the place where you were when you last quit—right down to restoring individual applications and data files. This utility also includes an auto-save feature. List price: $79.95. Binar Graphics, 800/228-0666, 415/491-4182. Reader service no. 675

FolderBolt 1.01

There are plenty of DOS security utilities out there, but Kent Marsh's FolderBolt stands apart through its effectiveness, ease of use, and low price. We got an early peek at this application and liked what we saw. As the name implies, FolderBolt locks Windows folders (DOS directories)—with the click of a mouse—from prying eyes. You can completely lock folders or make them "read only," and you can lock and unlock folders in groups. The company offers different levels of encryption from simple and fast to the ultrasecure Triple DES. The package also has a load of extras for use on a network, such as audit trails and data scrubbing. And for sending sensitive data through the phone or mail, you can create self-decrypting files. List price: $99. Kent Marsh, 800/325-3587, 713/ 522-5625. Reader service no. 676

WMEM.EXE

✓FREEWARE Do you run out of memory at the most inconvenient times? You need WMEM.EXE, a freeware display utility that shows available system memory. It continually updates itself as resources change. Sure, it won't deliver extra RAM, but it will let you know when you're skating on thin ice. Registration fee: none. Charles K. Snider, CIS: 73730, 1315.

double-clicking on its name in the files list. For only $15, how can you possibly go wrong? Truth be known, this handy little shareware utility works as well as much more expensive commercial products. One drawback: It doesn't search your archived files. Registration fee: $15. Peter Eddy, CIS: 71541,1420.

Golden Retriever 2.0

Golden Retriever offers more sophistication than the single-purpose Hunter, but at a higher price: $99. This file manager and searcher lets you organize files into six file drawers and an unlimited number of folders. The file cabinet metaphor is familiar enough, although it breaks down when you click on a file drawer. Inside, you find text-based listings rather than graphical folders. The setup is functional but lacks aesthetics.

Golden Retriever is particularly useful for grouping files related to individual projects. You can use descriptive file names up to 256 characters long. Its file manager lets you create, rename, and delete directories, format disks, and shred files beyond retrieval. Also, Golden Retriever offers a desktop where you can access many of Windows' utilities and set up icons for launching applications. And Above Software courteously provides you with an uninstall option. List price: $99. Above Software, 800/344-0116, 714/851-2283. **Reader service no. 658**

SmartSearch 1.1

✔SHAREWARE As the name implies, this is a smart application. Type in text that's close to what you're looking for—whether file name or text—and SmartSearch will go right out and get it for you. Searches are fast, and the program displays a list of files with the closest matches. Once you've identified your file, highlight it and click on the *Clip* button to

WinSock

✔FREEWARE WinSock shows you how much system memory you have available, like WMEM.EXE but in more detail. It lists every type of available memory and includes the amount of virtual (swap-file) memory you're using. In addition, you can set an alarm to alert you when resources get low. Registration fee: none. Chris Hewitt, CIS: 100036,133.

Trash-Can File Delete

✔FREEWARE Here's our suggested cure for Macintosh envy: This little freeware utility gives you that on-screen trash can that you have always wanted. Getting rid of files becomes a simple drag-and-drop procedure. The trash can bulges when you drop in a file, and you can untrash files by opening the trash can and double-clicking on the names of the files that you want to retrieve. When you shut down Windows, you will see a prompt to empty the trash, but you can also leave files in the can between sessions. Registration fee: none. Available through most shareware providers and on PC World Online.

WinBatch 4.0

✔SHAREWARE When you feel the need to control every aspect of your Windows operation, you need WinBatch from veteran utilities developer Wilson WindowWare. This complex and versatile utility is designed for Windows power users only. Using the 250-plus commands built into the program, you can create custom applications and utilities that go way beyond what you can do with a DOS batch file or Windows' macro recorder. WinBatch allows you to automate anything you can do with Windows, from the mundane (setting the date and time) to the complex (creating custom desktops). You can even hide the features that are most likely to get Windows beginners into trouble. Also available is the more expensive, nonshareware WinBatch Compiler ($395), which lets you compile WinBatch files to stand-alone programs for royalty-free distribution. WinBatch 4.0 registration fee: $69.95. Wilson WindowWare, 800/762-8383, 206/938-1740, 206/935-5198 (BBS).

WinPost

✔SHAREWARE Here's a really handy utility for those of you who want a software equivalent to the indispensable Post-it notes. These notes look exactly like the 3M originals, and you can change the size, color, and text font. In addition, you can edit, cut, paste, and even add alarms. You can use up to 100 reminder notes at one time, and the program will save them so they remain in the document. You can also embed notes in documents from any of the applications that support OLE. Registration fee: $30. Eastern Mountain Software, CIS: 71570,533.

WinTrail

✔SHAREWARE If you're the kind of person who wants to maintain a record of your every move; here's a shareware utility for you: WinTrail keeps track of how much time you spend in applications, storing an audit trail in a file that's reinitialized at the start of each day. You can also preserve or print the data. This product will come in handy if you wonder where all your valuable time is going, and it's invaluable if you bill for work you do by the hour. Of course, you may worry that the boss will get her hands on your copy and use it to monitor how much time you spend playing computer golf. Look for this one on PC World Online and most shareware BBS's. Registration fee: $15, Rooftop Software, West Sussex, England.

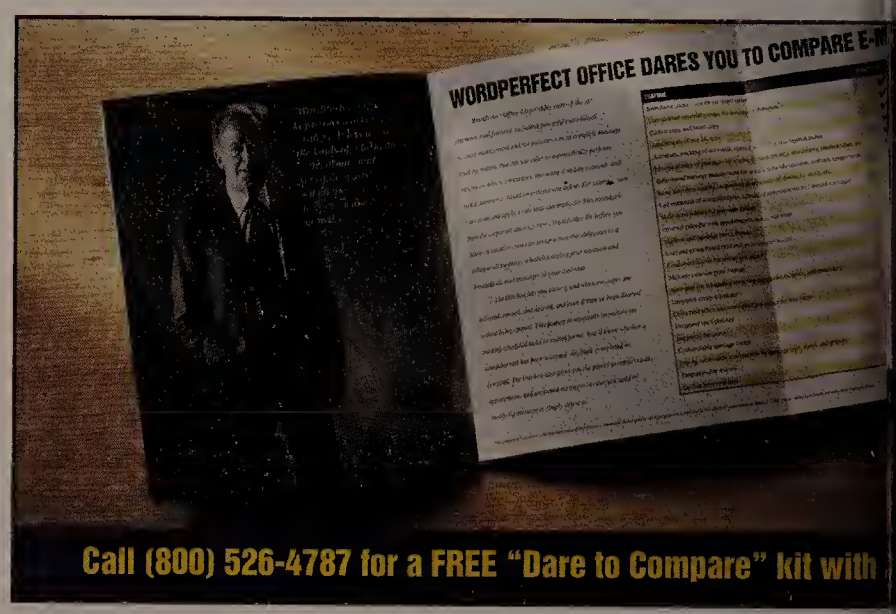
ZipShell 2.50

✔SHAREWARE If you save disk space by archiving your little-used files using one of the popular compression utilities, you'll appreciate this useful archiving/dearchiving shell. ZipShell lets you compress and decompress files—handling ZIP as well as ARC files—without leaving Windows. When you want to decompress files, just double-click on the name of the compressed file. To archive, you can just select the file names and click a button. Remember, as a shell, this product doesn't stand alone; you'll need the DOS versions of PKZip, LHARC, or both. Registration fee: $25. NewVision Software, 206/557-8330, CIS: 76020,732.

MICROSOFT AND LOTUS
E-MAIL PRODUCTS TO

HERE'S WHY.

Microsoft and Lotus aren't going to publicly compare their e-mail products to something substantially better. That's why they never mention WordPerfect® Office in any of their e-mail comparison advertising. But while Microsoft and Lotus won't compare their products to WordPerfect Office, you should. Because choosing a workgroup application is a strategic decision that will affect the way your organization works for years to come.



Dare to compare more than just e-mail.

Even if you just compare e-mail features, WordPerfect Office 4.0 beats everything in its class. But it takes a lot more than

NEVER COMPARE THEIR WORDPERFECT® OFFICE.

	E-MAIL	INTEGRATED GROUP SCHEDULER	INTEGRATED CALENDAR	INTEGRATED TASK MANAGEMENT
WORDPERFECT OFFICE	YES	YES	YES	YES
MICROSOFT MAIL	YES	NO	NO	NO
LOTUS CC:MAIL	YES	NO	NO	NO

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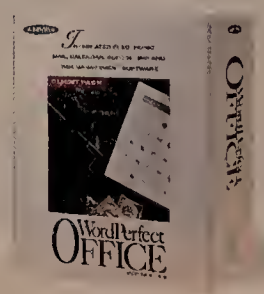
this, including a working copy of WordPerfect Office 4.0.

e-mail to run a business these days. WordPerfect Office is the *only* leading workgroup application that integrates group scheduling, a personal calendar and task-management functions with the industry's most powerful cross-platform e-mail engine. And WordPerfect Office gives you the complete package for what others generally charge for e-mail alone.

Call (800) 526-4787 for a FREE "Dare to Compare" kit

There are more than 100 different features you should compare when choosing a workgroup productivity product, and we can't begin to mention them all here. So we've prepared a free Dare to Compare demonstration kit, with a working copy of WordPerfect Office 4.0 and a detailed comparison guide. Find out for yourself why Microsoft and Lotus won't compare their e-mail products to WordPerfect Office. Call (800) 526-4787 for your free kit.

WordPerfect® Office



copy the file to the Clipboard. SmartSearch also comes in a demonstration version—a working program lacking only the best-match capabilities. Registration fee: $29.95. Terminal Velocity, P.O. Box 12, Peterborough, NH 03458.

Shareware Connection

If you're used to buying commercial software locally or through the mail, you may be at a loss when it comes to finding shareware. Fortunately, all the shareware and freeware programs in this article are available on PC World Online. You can also find a wide variety of shareware through the following sources.

Online Services and BBS's

America Online
800/827-6364 (membership), 703/448-8700

Channel 1
617/354-8873 (BBS)

CompuServe
800/848-8199

Exec PC
414/789-4210 (BBS)

Executive Network
914/667-4567 (BBS)

HH Info-Net
203/738-0342 (BBS)

PC World Online

PC World Online is part of America Online (800/827-6364) and CompuServe (800/848-8990)

Shareware Distributors

EMS
301/924-3594, 301/963-2708 (fax)

Public Brand Software (PBS)
800/426-3475, 317/856-4144

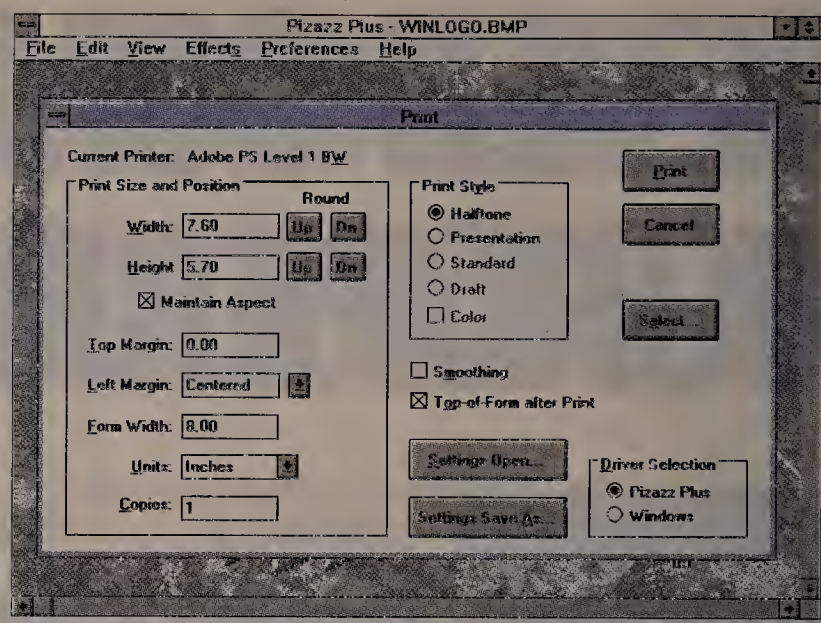
Public Software Library (PsL)
800/242-4775

Software Excitement
800/444-5457, 317/741-9092

Searcher Professional for Windows 2.0

For fast and efficient location of files and text, Searcher Pro is a low-cost winner with a bevy of extras. Searcher Pro can search across multiple drives and directories for both files and text even in compressed files, which you're able to decompress with a double click. You can search for file name, path, size, date, attribute, or text string. What's more, you can run multiple searches in a single operation: For example, you can search for more than one file at a time or for all archived files. Searcher Pro also supports Boolean proximity searches, letting you, say, find files that have the words *maximize* and *profit* in the same paragraph.

Once you've found your file, you can edit it or copy it. Searcher Pro can handle both versions of ZIP files and lets you zip, unzip, launch, copy, move, delete, sort, and view files—with an icon for each operation. And if you decide this useful program is not for you, just click on the uninstall icon and watch every trace disappear. List price: $59.95. Cognitronix, 800/217-0932, 619/549-8955. **Reader service no. 660**



PIZAZZ PLUS GIVES YOU MULTIPLE OPTIONS to optimize printouts of your graphics images.

Printing Utilities

Windows' built-in Print Manager is better than nothing, letting you send multiple jobs to your printer while spooling them in the background. But if hard copy is your life, you'll quickly notice its speed limitations. And we've run into apparent conflicts with other Windows applications, even when using fast new PCs with gobs of RAM. At times, spooling a large, font-heavy print job significantly slows keyboard response. Fortunately, good printer utilities can solve these and other printing problems.

ClickBook 1.0

Windows applications are generally optimized for printing single sides of letter-size paper. But things like address databases, catalogs, and manuals are usually handier in smaller editions. ClickBook solves the problem neatly, working with any Windows application to turn your data into any of 20 different dimensions and styles of booklet, all the way down to pocket size. For example, it'll quickly turn a 24-page document into a 5½ by 8½ booklet that uses six sheets of paper. And it'll do double-sided printing with any Windows-supported printer. List price: $69.95. BookMaker Corp., 800/766-8531, 415/617-1101. **Reader service no. 661**

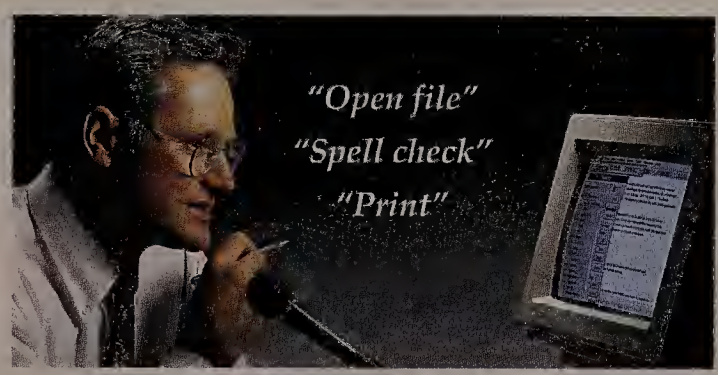
FLiP

✔SHAREWARE File List Printer, FLiP, is a shareware utility with a green computing twist. You can print up to four pages on a single sheet of paper—if they will fit and be legible. That saves paper and printing time, and FLiP allows you to add borders, headers, footers, and more. It prints text and binary files in a well-formatted, space-efficient way. You can get it on trial as a shareware utility for up to 30 days, after which a fee is requested. Registration fee: $20. Auburn Software, CIS 70400,1022.

Pizazz Plus

You might wonder what this $149 package of graphics tools is doing in the print utilities section. Sure, if you work with graphics files in any of the myriad *standard* formats, Pizazz Plus is a must-have. After you import an image into Pizazz Plus, you can crop it, change size and orientation, adjust color and shading, and even invert colors. But what does this have to do with printing? Pizazz Plus also shines in preparing images for printing. No matter which of the 500 supported printers you use, this package gets the most out of it. It's particularly adept at printing color images in grays on black-and-

PUT YOURSELF ON SPEAKING TERMS WITH YOUR COMPUTER.



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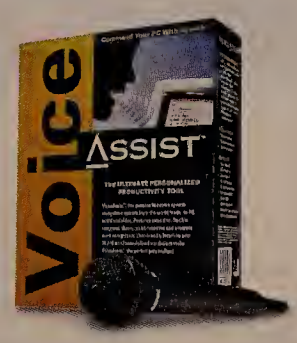

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*Sound Blaster or equivalent sound card with Windows audio drivers and microphone jack. **SRP $99.95. Dealer prices are currently as low as $69.00 and may vary. U.S. Inquiries: Creative Labs, Inc., Tel: 1-800-998-5227 or 1-408-428-6600. International Inquiries: Creative Technology Ltd., Singapore, Tel: 65-773-0233, Fax: 65-773-0353. Creative VoiceAssist and the Creative logo are trademarks of Creative Technology Ltd. All other trademarks are the property of their respective holders. © Copyright 1993 Creative Technology Ltd. All rights reserved.

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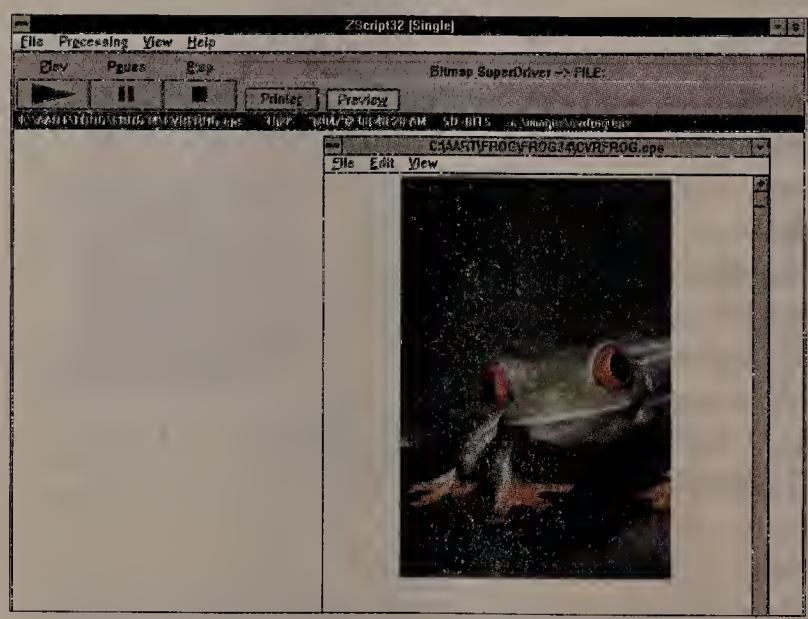
white printers. And while you can use standard Windows printer drivers, the package comes with its own. Furthermore, Pizazz Plus adds Windows and DOS screen-capture utilities. Best of all, there's a capable file-format converter that handles virtually every graphics format. List price: $149. Application Techniques, 800/433-5201, 508/433-5201. **Reader service no. 663**

PrintCache 3.1

This Print Manager replacement utility is a must if you print from Windows regularly. In our informal tests, it was nearly twice as fast at getting characters on paper. If you use a Hewlett-Packard LaserJet 4, the program adds human-voice error messages. Its advanced buffering also eliminates troublesome keyboard slow-down. You also get drag-and-drop printing and detailed on-screen printer and job status reports. List price: $99.95. LaserTools Corp., 800/767-8004, 510/420-8777. **Reader service no. 664**

ZScript With SuperPrint

ZScript is a fast 32-bit PostScript language interpreter for Windows that includes the SuperPrint Print Manager replacement. This utility lets you bypass the Windows PostScript printer drivers and use the SuperPrint drivers to speed printing. And that's just one side of the equation. ZScript's preview mode lets you view multimegabyte PostScript files before deciding if you really want to print all those pages. And ZScript lets you print PostScript files on non-PostScript printers, with surprisingly good results—even on dot matrix printers. If you don't need ZScript, you can buy SuperPrint 3.0 separately. List price: SuperPrint 3.0 $99, ZScript (includes SuperPrint 3.0) $295. Zenographics, 800/366-7494, 714/851-6352. **Reader service no. 665**



ZSCRIPT IS A 32-BIT POSTSCRIPT INTERPRETER that lets you bypass the Windows PostScript drivers to speed up printing.

Screen Capture and Graphics Manipulation

Capturing graphics screens from your Windows desktop used to be the kind of obscure function performed mostly by magazine and book authors. And sure enough, we used Clip'nSave to capture all the screens accompanying this article. But times have changed, and now these utilities get much wider play. For example, you might want to capture a screen for a corporate training manual or grab a chart or part of a worksheet for inclusion in a memo or report. Some of today's screen capture utilities also incorporate the features you used to find only in pricey graphics programs, such as the capability to convert graphics formats, manipulate colors, or even catalog images.

While HiJaak is a screen capture utility that takes DOS screen shots from DOS, HiJaak Pro 2.0 for Windows goes way beyond screen capture.

Clip'nSave 2.0

This program is deceptively small, simple, and inexpensive. But there's plenty of power hidden beneath the surface. With just the touch of a function key, you can capture an image of the entire desktop or the active window. If that's too limiting, you can specify a rectangular portion of the screen or even use a freehand mode to highlight exactly what you want to capture. Clip'nSave is one of the few utilities that will capture the mouse pointer if you want, as well as the contents of a DOS window. While the program captures the image as a bit-map (BMP) file, it can convert the BMP to many popular formats, including TIFF, PCX, RLE, DIB, and GIF. Furthermore, you can also convert graphics images from any of the numerous supported formats. Clip'nSave captures images with up to 24-bit (16.7 million) colors and can convert images down to 256- or 16-color or monochrome. It can also compress graphics images to save disk space. If that is not enough, Clip'nSave lets you quickly view and print virtually any graphics file you choose. List price: $79.95. Dynalink Technologies, 514/489-3007 (voice and fax). **Reader service no. 666**

Collage Complete 1.0

This utility started out as a vanilla DOS and Windows screen-capture utility and grew into a complete image-management system. Collage Complete captures full DOS screens as well as objects beyond the full screen or active window on the Windows desktop. You can capture a pulldown menu or title bar, for example, or specify a screen area. You can use its rapid-fire mode to capture multiple screens without pausing to save each image. (The file names automatically increment numerically.) Collage Complete offers image conversion to even more formats than Clip'nSave. In addition, it's great for clipping, cropping, cleaning, and combining images. It's unique in allowing you to add colored borders and text to images. Like HiJaak, Collage Complete supports Photo CD images as well as TWAIN-compliant scanners. And to make sure your images don't get lost in the shuffle, its image cataloging system lets you peek at thumbnail displays. List price: $149. Inner Media, 800/962-2949, 603/465-3216. **Reader service no. 667**

HiJaak Pro 2.0

HiJaak has been around for over a decade—it started life as a screen capture utility for DOS. It's still one of the few that will capture DOS screens from DOS, but HiJaak Pro 2.0 for Windows goes way beyond screen capture. In essence, it's a whole collection of tools that lets you capture, view, convert, enhance, print, and catalog graphics images. HiJaak shines at converting

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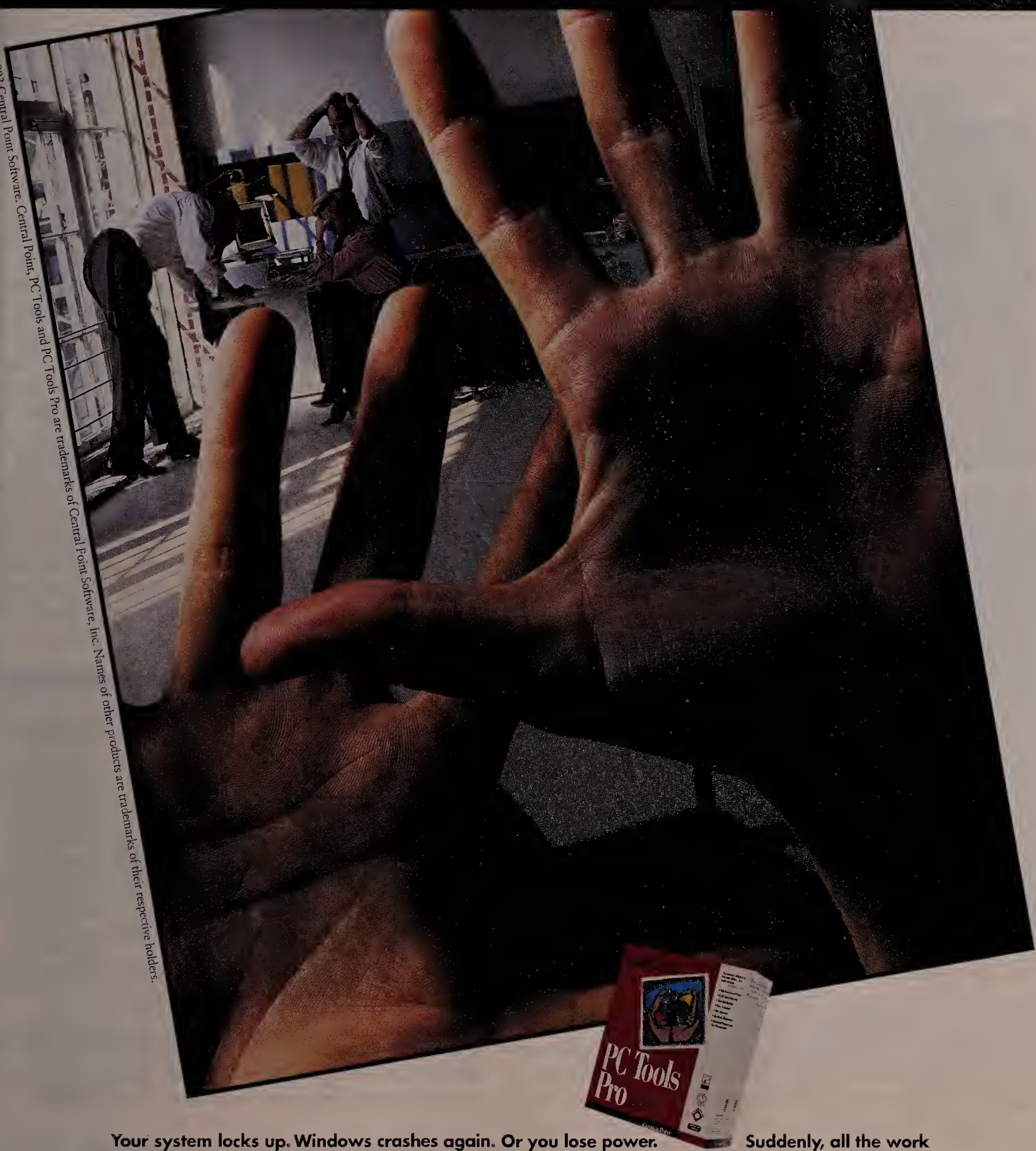

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Your system locks up. Windows crashes again. Or you lose power. Suddenly, all the work you forgot to save disappears from the face of the earth. Forever. Unless, of course, you're protected by new PC Tools Pro for DOS. It has an ingenious new recovery feature called CPR, that can even bring back your unsaved work. (Norton Utilities can't.) PC Tools Pro also repairs and optimizes compressed drives and diagnoses the most elusive hardware problems. And protects you from all computer viruses known to man. (Norton won't.) It even lets you do automatic backup. (Norton doesn't.) But that's not all. For a more revealing comparison of PC Tools Pro vs. Norton, call FAXBACK at 1-800-847-8766 and ask for document 97529. For all upgrades, just call 1-800-277-3946.

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CENTRAL POINT

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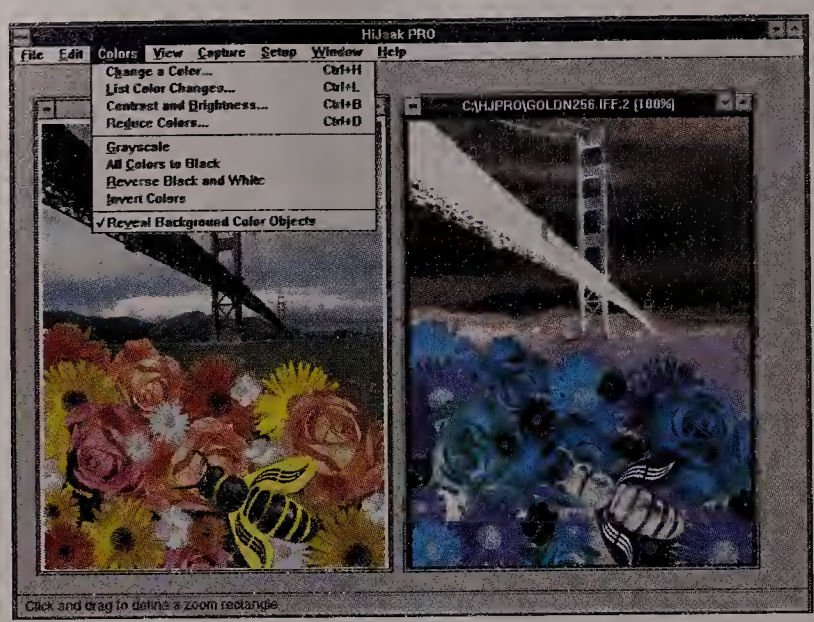
graphics formats. It supports over 70 formats—more than the capable Collage Complete. You can import any supported format—including Kodak Photo CD—and convert it. JPEG compression is built in, compressing graphics images as much as 200:1. And the program supports the widely used TWAIN specification for importing images from scanners.



JUST ONE OF HIJAAK PRO 2.0'S MANY HANDY TRICKS is the capability to easily invert colors.

HiJaak Pro 2.0 also offers multiple image manipulations, including tweaking of colors, contrast, and brightness. There's also a browser that lets you quickly view thumbnail images of all the graphics images on your hard disk. And last but not least, HiJaak Pro 2.0 comes with a library of 300 clip art images. When you register the program, you get 200 more. This is the product of choice for the graphics pro. List price: $169. Inset Systems, 800/374-6738, 203/740-2400. **Reader service no. 668**

ImagePals 1.2

ImagePals has so much to offer, we hardly know where to start. Its image-editing module comes with a subset of features we could compare to those of high-end packages like Adobe Photoshop or Micrografx Picture Publisher. ImagePals' screen-capture module, which works only in Windows, features a unique processing option that can automatically convert the captured screen to your preferred format, file it, and print it. The program's Album option is the best image management tool among the packages reviewed in this article. Album searches your entire hard disk for graphics images and then organizes them into user-definable collections. A slide show option allows you to choose a group of images and display them in sequence—manually or automatically. ImagePals usually lists for $249, but it's priced at only $99 through December. Even at the higher rate, it's still a superb value. And you would pay a great deal more for separate packages than for the all-inclusive ImagePals. List price: $249. Ulead Systems, 800/ 858-5323, 310/523-9393. **Reader service no. 669**

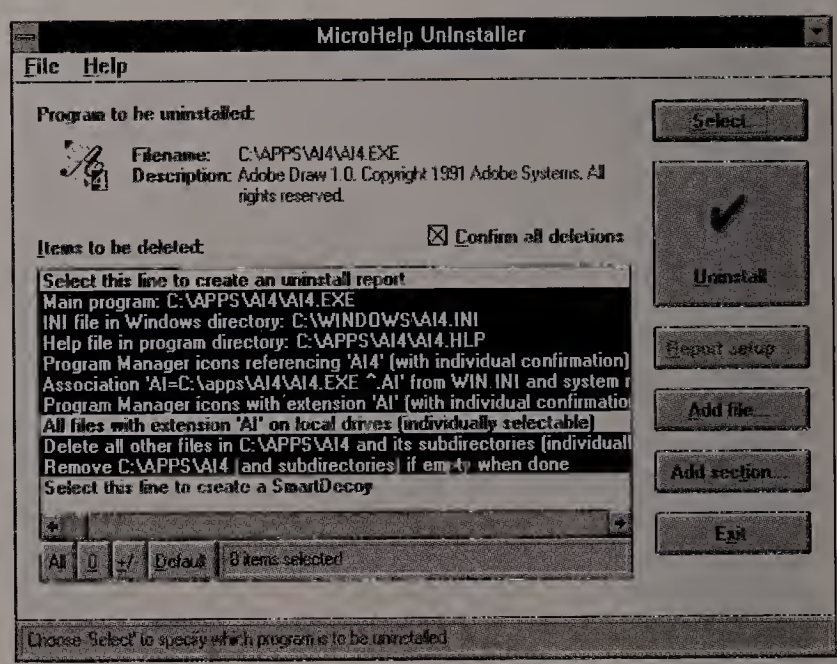
UnInstaller 1.11

One of the major differences between the good old days of DOS and the brave new world of Windows is the complexity involved in deleting applications that you no longer need. With DOS, sweeping out the old used to be as simple as entering DEL *.* at the DOS prompt in the unwanted program's directory. Not with Windows! You can delete an icon, but the program remains. Delete a program directory and its files, and you're left with files and changes the installation has scattered throughout your Windows directories and system files. More applications are offering uninstall options, and some come with full documentation that describes the changes. But there are still ill-behaved applications seemingly designed on the assumption that you will never want to let them go. To maximize disk space and Windows performance, you will want to get rid of the deadweight—painlessly. That's where UnInstaller comes in.

UnInstaller gives you exactly what its name implies: the quick, easy removal of unwanted Windows apps. This utility analyzes your Windows environment to find out where the original application setup made changes to existing files. Normally it can locate all the application's files without assistance and also find changes in INI files. It deletes all the files and INI additions along with the application icons.

As with any major change to your system, you should start with a full backup. Fortunately, UnInstaller takes a cautious approach, with repeated prompts before deleting files. And it won't let you delete Windows essentials. LAN administrators will love this utility, because MicroHelp has made provision for removing from workstations all references to deleted LAN applications. Uninstaller uses an ingenious SmartDecoy feature that automates workstation deinstallations. When workstations attempt to run the missing application, SmartDecoy prompts them for permission and then removes all references to the application.

UnInstaller also comes with INIClean, a separate utility that keeps track of changes in INI files and lets you edit them. Like the main UnInstaller utility, it won't allow you to delete essential parts of your INI files. Although the worst-behaved applications can sometimes fool UnInstaller and leave a few unidentified files behind, you will still end up with a cleaner Windows. List price: $79. MicroHelp, 800/922-3383, 404/516-0899. **Reader service no. 670**



MICROHELP'S UNINSTALLER SEARCHES the nooks and crannies of your hard disk to clean out every remnant of unwanted programs.

Anne Fischer Lent and Stan Miastkowski are coauthors of The Windows for Workgroups Bible *(Addison-Wesley, 1993). They can be reached on PC World Online and on Internet: alent@bix.com and stanm@bix.com. John Goddard is an assistant editor for* PC World.

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If you're one of the following people, your new 1994 DOS or Windows Quicken upgrade is now ready. Both new Quickens are so loaded with new time savings, new financial insight, and new power to organize — you'll think we redesigned it just for the unique way you personally use Quicken. For instance:

A You're too busy to read anything else in this ad.

You busy on-the-go types will love having Quicken organize your finances the way you organize all your other activities — with the new Quicken Financial Calendar.™ It remembers whom you pay, how much, when, how often — and makes the register entries for you automatically.

Whether the bill is a 36-payment car loan or a 360-payment mortgage, a twice-a-year property tax bill or your every-month phone bill — schedule it just once on the Financial Calendar, and you never have to enter it again. (You can confirm the amount each time if you wish.) And your regular deposits — weekly paychecks, monthly interest, whatever — are just as easy and convenient to handle automatically.

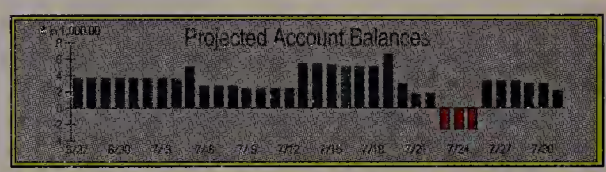
The Quicken Financial Calendar. It just may be the most radical planning-and-organizing tool since... well, the calendar.

B You just like knowing where your money goes.

New QuickReports are just for you. Zoom out from any individual transaction in a register to see instantly when you last paid that bill or get a list of all transactions for that payee or category. It's like getting an instant "mini-report" any time you need it.

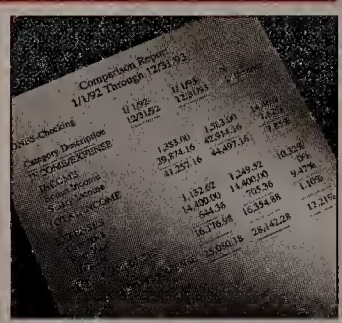
And for the first time ever, new Quicken 3 for Windows even forecasts your future. The new financial planning graph projects your account balances, cash flow and net worth for the next month — or up to the next two years — based on the transactions you've scheduled onto the Financial Calendar.

This could be the biggest breakthrough in Quicken ever! Just "drag and drop" transactions to the correct dates. Then let the new Quicken Financial Calendar make all your regular register entries for you automatically from now on. Or, you can put any transaction on "total automatic" and never look at it again — or you can be prompted each time to confirm (or change) the amount. You can also make one-time register entries with the Financial Calendar.



Use this graph to play "What if..." and see the precise impact that decisions like saving more, vacationing sooner or even eating out less will have on your future account balances.

C You don't just organize —you analyze in detail.



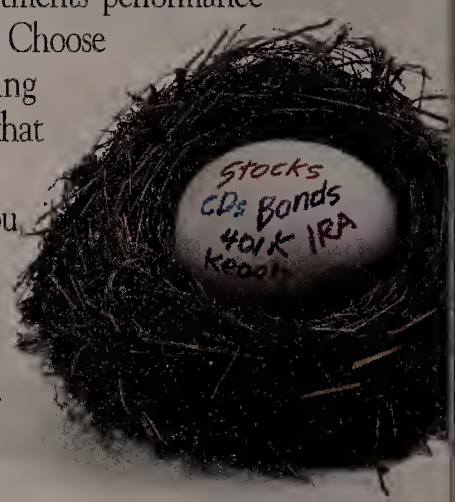
You can compare this year's income and expenses with last year's, or analyze your cash flow with percentage breakdowns. The new comparison report shows any two periods side by side — sorted by account, category, payee or class. And it gives the variance in dollars, as a percentage, or both.

You can also copy reports to the Windows™ clipboard in tab-delimited format, for easy import into your spreadsheet or other Windows applications.

D You plan to retire someday. (Or you're already retired.)

Now you can see better than ever exactly how your retirement fund and investments are doing.

The new investment portfolio view provides instant comprehensive analysis of your investments' performance and value. Choose the investing measures that mean the most to you from at least 14 different options — including estimated income, ROI, percent yield, and much more.



And now it's much easier to enter new investment activity, too. Just fill out the new onscreen investment activity form. It prompts you for the specific information relevant to virtually any investment transaction.

Quicken upgrades following people:

E You love Quicken's speed and ease.

The new amount field calculator is radically different — and it's the most convenient onscreen calculator ever. Just type any equation (such as "2.75 + 4.95 x 1.08") directly into the Payment or Deposit column, and it enters the answer for you automatically.

And the new date field calendar makes date entry easier than ever, with no typing.

Plus: backup is automatic in Windows now as well as DOS.

F Your Quicken is more than two years old.

If you've been too busy to upgrade lately, you've been missing some very popular new features. Like QuickFill.™

Completes any repeat entry for you automatically. Just type the first few letters!

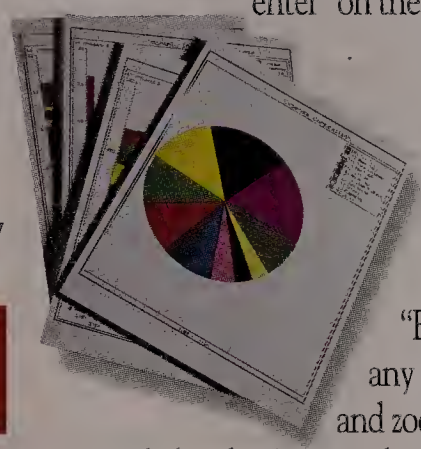
Plus IntelliCharge™ electronic credit card statements. And the innovations in QuickZoom,™ financial reporting and investment tracking we've mentioned all build on literally hundreds of earlier new features and enhancements. Like loan amortization, financial planning calculators and better links to tax packages, to name just a few.

And learning new Quicken features is easier than ever, too — with new Qcards™ to guide you step by easy step.

G You don't (and won't) do Windows.

New Quicken 7 for DOS has its own way of doing just about everything we've mentioned for Windows, plus special features which DOS users in particular will appreciate. For starters, your graphs look better, work harder, and you can print them out, too.

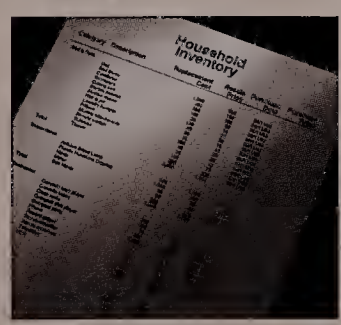
New QuickZoom for graphs shows the "numbers behind the pictures." So you can press "enter" on the graph of your May expenses, for example, and zoom to a pie chart breakdown on them. "Enter" again on any piece of that pie, and zoom to the transactions behind it. Yet another "Quicken easy" way to answer your questions fast!



To name just a few more items: Now you can save multiple budgets. And new Quicken 7 for DOS also remembers your last transaction so you can get to it in an instant. There's much more. We're as committed to DOS as you are.

H You can never be too organized.

Windows users: Introducing new Quicken Companion™ 2 for Windows — featuring the new Quicken Home Inventory.™ It organizes all your household possession records in one place, in about an hour. Just scroll through the "reminder list" and click on "your" items, keeping or changing the average replacement values as you go. Now you've got a complete insurance coverage report to help you make informed insurance decisions, and provide solid claim backup, too.



Quicken Companion also estimates personal taxes, provides online stock and mutual fund pricing, and includes expert tips for getting the most out of Quicken.

If you upgrade to Quicken 3 for Windows, be sure to get Quicken Companion, too.

I You like choosing from 3 special upgrade offers.

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DOS System Requirements: 100% IBM® compatible PC with 640 RAM, DOS 3.0 or higher, and a hard disk drive. Graphs require graphics card. Guaranteed to work with your printer or monitor, or your money back. **Windows System Requirements:** 100% IBM® compatible PC, 286 or higher (386 recommended), Windows 3.1, 2MB RAM and 5MB free on your hard disk. **Quicken Companion** requires additional 2MB free on your hard disk. Works with any printer or monitor supported by Windows 3.1. Quicken 7 for DOS and Quicken 3 for Windows are file compatible.

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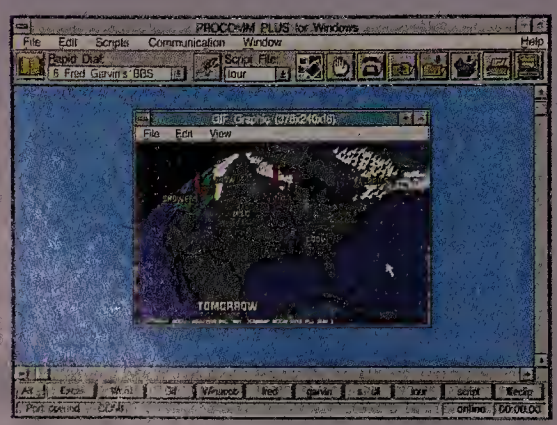

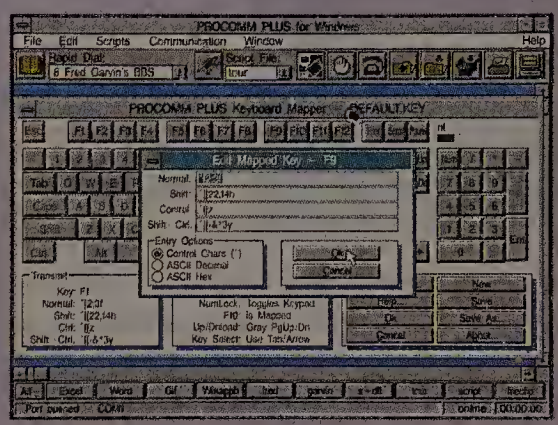

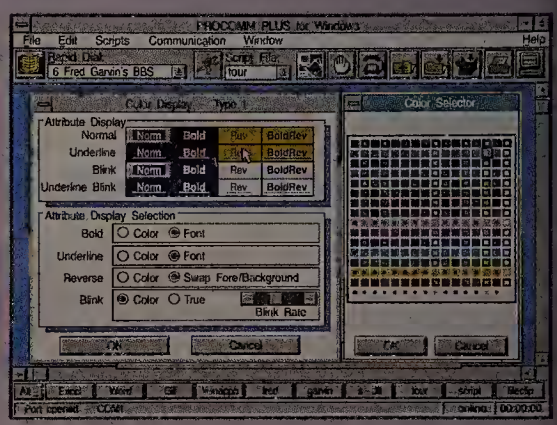

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Small Office Home Office

From high-rise to home: How to set up a small office that works.

282 Making the Small Office Work

290 Best Voice Forward

293 Taxes and the Home Office

300 Tools of the Trade

312 Information, Please

Edited by Steve Fox

ILLUSTRATIONS BY GORDON STUDER, COVER PHOTOGRAPHY BY ROBERT CARDIN

HP DeskJet color *printers*

There

COLOR
HITS THE MASSES

Let's face it, we're living through a revolution. Color has come to the business world. The question is no longer if you'll be using color, but when.

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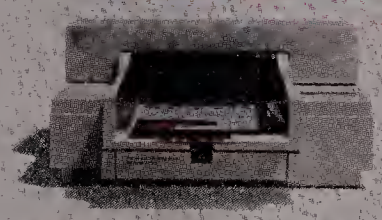

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DOES YOUR HOME OFFICE NEED TO BE AT HOME?

There are over 20 million home offices. But if your home does not lend itself to becoming an office, or you simply don't want to work in your home, here are a few different alternatives:

1. Office or professional suites. As corporate downsizing empties office buildings, office suites are moving in, providing small offices for rent by the month, day, or hour. These suites also provide conference rooms, a receptionist to greet visitors and answer the telephone, and often a full range of secretarial services.
2. Business incubators. Frequently sponsored by cities, counties, or the local chamber of commerce, incubators offer pooled services and a private office at reasonable prices. The catch: They typically require leases of at least a year.
3. Sublet space. Companies that have leased more space than they need can provide office space without a long-term commitment. Ideally, try to rent space from a business related to your own, as this can lead to referrals.
4. Van or boat. The ultimate in mobility, vans and boats provide working facilities for more and more people. We recall meeting a San Francisco lawyer whose business card showed only a telephone number. We found out his office is in the rear of his chauffeured limousine. Increasing numbers of people are making vans both home and office, going from site to site and city to city—wherever their work is. With the plethora of portable computers, fax-modems, high-quality printers, and phones, you can be in constant communication with the rest of the world.

employee theft and corporate espionage and complying with Occupational Safety and Health Administration regulations. For the stand-alone office, safety and security issues are less highfalutin: Am I protected against fire and burglary? Is my data safe from mishap? How can I avoid eyestrain, backaches, and repetitive-strain injuries?

For instance, if you stare at a computer screen all day, you're a prime candidate for eyestrain—a real productivity killer. The right lighting will ease the burden on your eyes, but if you still notice eyestrain, consider upgrading to a computer monitor and add-in graphics card that support a flicker-free 70-hertz refresh rate.

To minimize neck pains, backaches, and other occupational discomforts, buy a quality chair and set your desk and monitor at the right height and angle. And to protect against repetitive-strain injuries like the dreaded carpal tunnel syndrome (a persistent, disabling pain in the wrist), make sure your equipment fits you and is adjustable. Ergonomic keyboards, mice, and chairs—as well as wrist supports and armrests—can help keep you off the disabled list. And remember to take frequent short breaks while you type.

Power surges and outages can seriously damage your data and equipment. To protect against surges, use a power-spike protector; for outages, try an uninterruptible power supply unit, which gives you sufficient time to exit your application and shut down your equipment safely in case of a power loss. No matter what the price, these items will always be less costly than repairing damaged equipment and re-creating business records.

To protect your home office from fire and burglary, have your local police and fire departments perform a free inspection to see if you have adequate protection. They may recommend additional fire alarms or more secure locks and perimeter burglar alarms. (Some alarms can tie in directly to your computer.)

For your business safety—and as a disaster-recovery measure—we recommend that you back up your data regularly and store the copies off-site. For instance, you can keep backup copies of financial records with your accountant, while storing backups of other data in a safety deposit box or at a public storage facility. Such storage entails additional costs, but the ability to re-create your business records is priceless.

Regardless of the steps you take to protect your office, there is always a chance that those measures will fail. Fortunately, most home-owner insurance policies allow riders that cover basic business needs. You'll find more information about insuring your office in the accompanying article "Of Insurance, IRAs, and Peace of Mind."

PRIVACY AND SEPARATION

How separate should your office be from other activities? That depends on your work style and the demands of your business. Before you set up an office, ask yourself the following questions: Do I like to have the door closed when I work? Does the sound of music, television, or conversation distract me? Do I have phone conversations or meetings that should be private? Do I keep confidential information in my files? Will I have business visitors? Is it important that my visitors not be seen or heard by one another while in my office?

If you answer yes to many of these questions, you may wish to consider a separate building, an entrance for business guests, soundproofing, or at least an office with a solid door. You may also want to place locks on your file drawers and take security measures with your computer.

If you work in a home office, you need a clear demarcation between where the home ends and the office begins. This division will help you start work in the morning, stick to business, and close the door on work at the end of the day. It will also let your family know when you're working and don't want to be interrupted. Finally, a clearly delineated office space is essential if you plan to claim a home office deduction (see "Taxes and the Home Office"). If you can't devote a separate room to your office, subdivide an existing space with a bookcase, a screen, curtains, or a new wall.

So what is the key to making a small or home office work? In a word, planning. It's easier and less expensive to do it right the first time than to fix problems later. ✦

Paul and Sarah Edwards are the authors of the best-selling Working From Home *and* Making Money With Your Computer at Home. *They founded CompuServe's Working From Home forum, cohost the weekly home-office radio show on the Business Radio Network, and are editors for Windcrest/McGraw-Hill's computer entrepreneur book series.*

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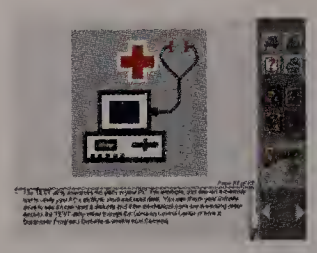

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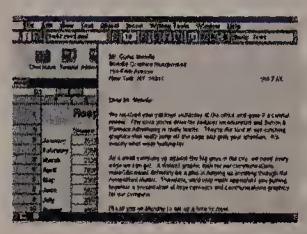

"Hi. You've reached Sally and Dean. We can't answer the computer right now, so leave a message after you hear the beep . . . "

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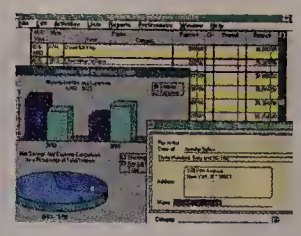

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Circle 47 on reader service card

Best Voice Forward

Can't afford a receptionist? The solution: do-it-yourself PC-based voice-mail, which makes even the smallest office sound like the Fortune 500.

The phone is your connection to the rest of the world. So how does a small office make a big impression when there's not enough money to hire a receptionist? With a voice-mail system, which is so inexpensive and easy to install that anyone with a PC and a bit of patience can operate one.

Despite detractors who disparage voice-recording systems as impersonal, large companies have wholeheartedly adopted voice-mail as a timesaving device. In general, these firms' voice-mail systems—adjuncts to their PBX or other key-switch phone systems—require telephone hardware far beyond the needs (and budgets) of most small businesses. But now that a spate of low-cost systems capable of handling call transfers and message forwarding have appeared on the market, small businesses are jumping on the voice-mail bandwagon.

The most rudimentary voice-mail system, of course, is a cassette-tape–based telephone answering machine. But it offers little flexibility to the caller. The recording quality is poor, outgoing messages are time limited, cassette tapes tend to snarl, and message retrieval is generally a simple sequential playback of all messages or a chancy hunt-and-peck operation.

Most local phone companies offer an easy upgrade from the answering machine with their own voice-mail systems. These usually offer message handling and storage, including such niceties as personalized greetings and message-skip functions on playback. Costs vary, but a typical telephone company voice-mail system costs anywhere from $5 to $10 per month, plus an initial setup fee. Mailboxes hold a limited number of messages, and there's no easy way to forward or permanently record a received message. In addition, users must call the phone company to make even simple changes in service, such as reducing the number of rings before the voice-mail system answers. And the bill comes in every month.

If you run a business, you need something more sophisticated than simple voice-mail; that something is an expansion board that fits into a PC. These boards sport *digital signal processors* (DSPs)—microchips that put the power of handling voice, fax, and data transmissions in one processor. Once installed with the requisite software, these boards let you plug your telephone into your computer. Your outgoing message is stored on your computer's hard disk, as are all incoming messages. As callers press keys on their touch-tone telephone or computer keyboard, they receive requested information and can even have faxes forwarded to them.

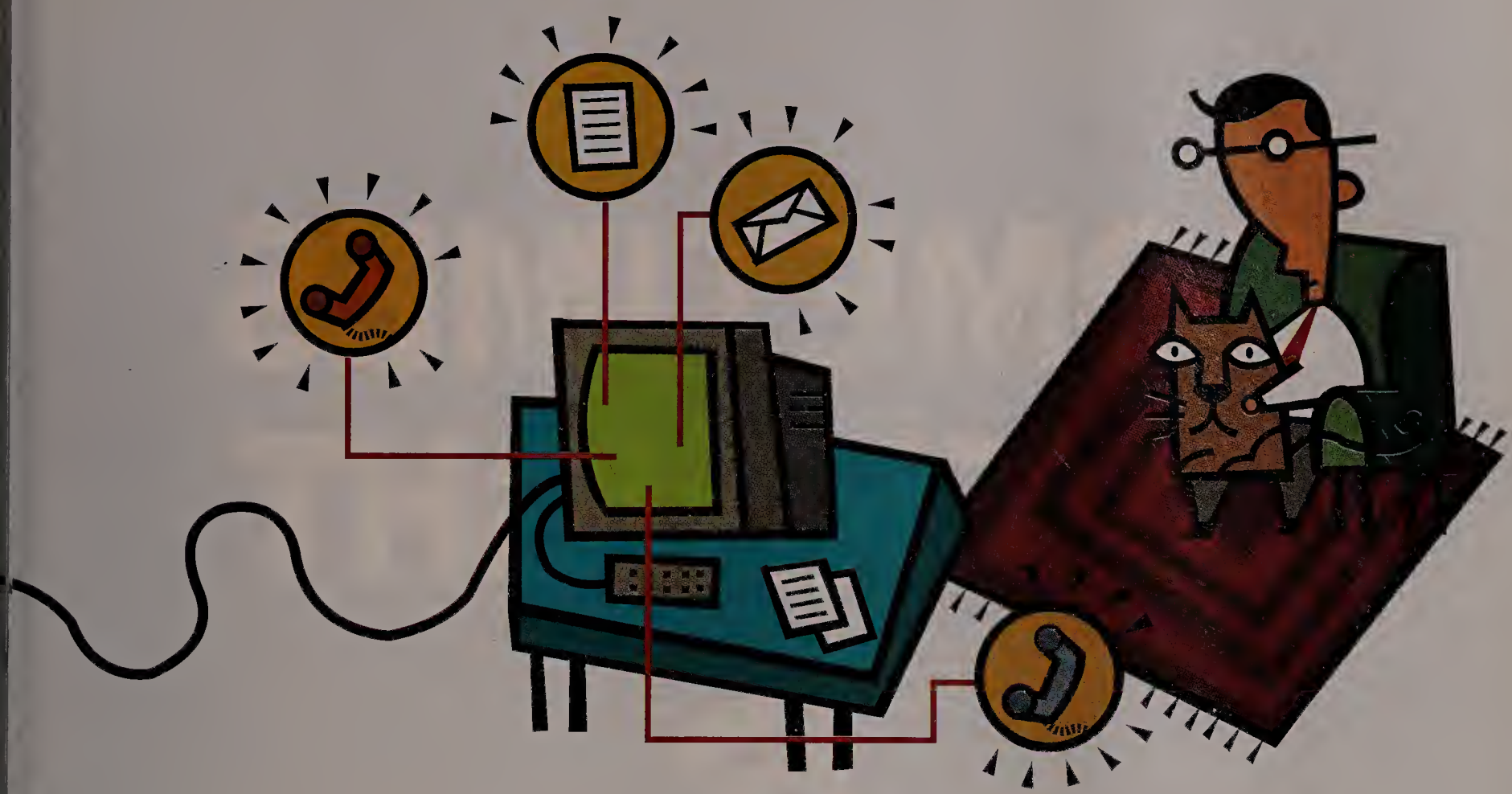
New voice-mail products will be released throughout 1994, but the current leaders are the TyIn 2000 PC Communications Center, Complete PC's Complete Communicator, FaxQuest's Robofax-EZ, and Edens Technology's PhoneOffice.

The Complete PC has been a traditional force in this field, so we tried out the Complete Communicator 3.1. Boasting a sharp Windows interface (a less attractive DOS version ships in the same package), the Communicator can be configured as a stand-alone voice-mail system with call transfer and message forwarding functions (yes, your computer can call my computer *and* leave a message). You can turn the voice line into a fax-receiving line; and if you add telecommunications software, the Communicator can handle modem data.

Incoming callers can review, delete, and even restart their messages. When Windows is running at the receiving end, a small box pops up on screen to announce that a phone message has arrived. A few mouse clicks open the mailbox queue, displaying each message and its date, time, and length. Two more mouse clicks play back selected messages. It's just as easy to archive messages for later retrieval if necessary.

Like other DSP products, the Complete Communicator also serves as a stand-alone

BY THOM FOULKS



fax card or modem, thanks to the included RapidFax and BitCom software. At press time we learned that the $499 Complete Communicator 3.1 had been replaced by the Complete Communicator-EZ, a nearly identical product with a $99 price.

When you first see TyIn 2000's tiny manual, you may think National Semiconductor forgot to include documentation. Not so; there's extensive online help, and that flimsy booklet proves sufficient for getting this easy-to-install Windows program up and running. Once configured, TyIn 2000 automatically detects whether an incoming call is voice, fax, or data, and switches to the appropriate mode to receive it. Of course, it also sends faxes and data—with built-in compression and error correction. Faxes travel at 9600 bps, while data moves at a pokier 2400. You can send faxes directly from any Windows application and even schedule them to be sent at a later time.

TyIn supports remote operations, offering easy-to-configure password options for flexible message retrieval. If your office has more than one user, you can set up multiple mailboxes on a single line. Callers can simply press a button to be transferred to the mailbox of their choice, where they can leave a private message. The $279 package's sound board lets you send and receive voice-annotated Windows documents.

Robofax-EZ is tailored for small businesses where many transactions can be handled by fax. At a small real estate office, for example, Robofax could respond to a request for listings with a fax of available properties. At a bookstore it could provide a schedule of upcoming book-signing sessions with authors.

The most rudimentary voice-mail system, of course, is a cassette-tape–based telephone system; your business needs more.

Robofax-EZ is aptly named: Plug in the card, run the install program, plug in the phone line, and a sample system is in operation immediately. Voice message instructions are customizable—the package includes a microphone.

The $495 Robofax has a few drawbacks: No other program can operate while Robofax is running, so it requires a dedicated machine; it's not Windows compatible; and users must dial in from a touch-tone phone attached to a fax machine to receive documents. Fortunately it will run even on a nearly obsolete 286 machine.

The $1195 Robofax-Pro, which should be hitting the streets by the time you read this, comes packed with two TyIn 2000 boards (for two telephone lines) and software capable of handling four lines simultaneously, in addition to other enhancements.

PhoneOffice, with a suggested retail price of $495, shares many of the talents of its DSP-based brethren. Though it lacks some of the Communicator's goodies—callers can't edit messages, for example—it has a well-designed Windows interface. And it's easy to use and maintain after setup, although all but the most skilled computer gurus may need help in setting up PhoneOffice's "decision tree" of options for callers.

All four programs have one thing in common: They need ample hard drive storage space. A firm whose callers are likely to leave 3-to-4-minute voice messages could easily find itself chewing through 100MB of hard disk space in a single afternoon. Other hardware requirements, though, are less onerous. To run the Windows-based products, you need at minimum a 25-MHz 386 with 4MB of RAM to ensure proper voice-mail recording. Given the rapidly dropping prices of computers these days, this equipment should be well within the financial reach of most small offices—especially small offices that want to sound like big ones. ✦

Thom Foulks is a contributing editor for PC World.

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Taxes and the Home Office

How to set up a deductible home office—and survive the audit.

The Supreme Court dealt a heavy blow to the home office last winter when it ruled that a Virginia anesthesiologist could not claim deductions for a spare bedroom where he kept patient records and made calls, even though he had no other office. The court reasoned that Nader Soliman spent most of his time in hospitals, where he performed the "essence" of his job. His home office, the court said, was tangential to his job's true function.

"If your home isn't your principal place of business, you won't be able to deduct the expenses, even if the home office is necessary," says Janet Attard, author of *The Home Office and Small Business Answer Book* (Henry Holt and Co., New York, 1993).

How can you tell if your home office is tax deductible? The rules are strict. Your home office must serve as your primary place of business—the place where you perform the most essential functions of your job, produce products, or meet with clients. It must be used exclusively for your job. It can't be a place where the kids watch TV or you ride your exercise bike. It must also be used regularly. A spare bedroom where you type once a month won't cut it.

PASSING THE IRS TEST

It's important that you document the office's regular use by keeping a business calendar or log of activities. "Record keeping is critical," says Bob Coplan, principal in the national tax department of the Washington, D.C., office of Ernst & Young. "Keep records that establish that the office is used exclusively for your job—exclusivity is the IRS's key test of deductibility."

Cliff Roberson, author of *Fight the IRS and Win: A Self-Defense Guide for Taxpayers* (Liberty House, Blueridge, Pennsylvania, 1988), advises that you meet clients in your home office if possible. "I think the point is very important in selling the IRS on the office's deductibility. A separate entrance also helps quite a bit."

Must the home office be a separate room? No. It can be a corner in a bedroom or den, but the IRS will be more convinced if the corner is blocked off with a screen or partition. "It gets dicey when you set aside half the area in your family room as a home office and you're working while watching TV," says Jack W. Slick, Jr., a Hagerstown, Maryland, accountant who specializes in home businesses. He says it's important that personal activities be kept strictly out of the home office.

Even if your office is used only for work, it may still flunk the all-important exclusivity test if you use it for two separate business activities. Say you use it for catching up on work from your day job in addition to conducting a consulting business on the side. Or your husband uses it as a place to catch up on business correspondence, while you see clients there. In these scenarios, the IRS would disallow the home office deduction because the office is not the focal point of both business activities.

"Do the work from your nine-to-five job on the living room couch, and you won't have any problems," says Attard.

Employees who take work home at night don't qualify for a home office deduction. "You can't simply be doing work at home that you could have finished by staying late at the office," says Coplan. If you work for someone else, a home office is deductible only under certain circumstances. The home office must be a condition of your employment, and it must be maintained for the convenience of your employer.

Be careful if you're a consultant working for a single company. Your client may call you an independant contractor, but the IRS may still consider you an employee. "The IRS has a broad definition of what an employee is," says Coplan. "You have to have control over when, where, and how you do your job to avoid the IRS labeling you an employee." Should you fall into the employee category, you may lose your home office deduction and be subject to fines, back taxes, and a tangle of red tape.

And what if you're a salesperson? You might still be able to take a home office deduction if the office is in a structure separate from the house. "If Soliman had been working in his garage, he would have qualified for the deduction," says Jeff Keyser, national director of personal tax services at Deloitte & Touche in Cincinnati. To that end, tax planners advise that if you're going to run a home office in a garage or other structure on your property, subdivide the property and install a separate electricity hookup.

THE IMPORTANCE OF BEING PROFITABLE

The IRS does not want to subsidize your hobby. The agency's test of what distinguishes a hobby from a business is whether it generated profit in three out of the previous five years. If it did not, you can still hold on to your home office deductions if you can prove that you conducted your

BY JUDY HEIM

home business in a professional manner with the clear intent of making money.

"Keep good business records and keep all correspondence," says Attard. "You want to show the IRS that the time and effort you put into the endeavor was a consistent, honest effort to earn a profit."

While losses reported on Schedule C, Profit or Loss from Business (Sole Proprietorship), can be taken as deductions against your income, you cannot deduct losses generated on Form 8829, Expenses for Business Use of Your Home. (Schedule C is where you report expenses like paper clips, meals, and travel. Form 8829 is where you deduct a portion of your rent, utilities, mortgage interest, and other expenses of your residence.)

"What raises eyebrows at the agency is when you've got $5000 invested in equipment like computers, but you earn only $1000 a year," says Keyser. That's when the IRS starts to wonder if what you're really doing in your home office is a hobby.

SETTING UP BOOKKEEPING

Good record keeping is critical for a home office. Since the IRS is often skeptical of home office deductions, you want as much documentation as possible if they audit you. If you're new to the home office game, it's a good idea to sit down with an accountant who will show you what records to keep. A couple hours with an accountant will cost $150 to $300, but the advice will be worth it.

Do you need an accountant? While many home office workers can fill out their own tax forms, everyone can use advice at some point. Look for one with expertise in your field and lots of experience with small businesses.

It goes without saying that you should keep receipts for all business expenses, from stamps and floppy disks to legal and banking fees. Also keep receipts and bills for indirect expenses like rent, utilities, phone, and insurance. File your utility bills each month in an accordian folder. Keep your other receipts in a manila envelope or folder, and tally them at the end of the month. Keep all canceled checks. Whenever you take a business trip, bring along a diary in which to stuff receipts and record daily expenses. Remember to keep track of your car mileage, because any business travel that takes you away from your home office is deductible at 28 cents per mile.

You don't technically need to keep a log of your computer use because it's theoretically being used exclusively for business. But be careful. Says Coplan, "The IRS tends to be suspicious if there's only one computer in the home and the taxpayer claims it's being used only for business." Keep a log anyway. The same goes for cellular phones. Ask your carrier for a monthly log of phone charges.

The cost of regular phone service is deductible if the phone is a private line to your office. Otherwise, you can deduct only the cost of long-distance calls and special services like call waiting and call forwarding.

Meals and entertainment are only 50 percent deductible. While membership fees in professional societies are fully deductible, dues in civic clubs no longer are.

If you're a homeowner, you should also keep receipts for any improvements to your home, even if they don't affect your office directly. "One area where taxpayers fall down is in keeping track of depreciation deductions," says Slick. "You should have depreciation schedules as far back as your depreciation goes. You should print out hard copies and keep a settlement schedule,

OF INSURANCE, IRAs, AND PEACE OF MIND

All right, you've dealt with taxes, and death isn't a concern—yet. Of the hundreds of financial issues a home office worker must face, you should next concentrate on ensuring your peace of mind. In the short term this means protecting yourself and your business against mishaps; beyond that, it means planning for retirement.

What follows is a kind of annotated insurance checklist, and it's a good place to begin. But it pays to cultivate a personal insurance agent, preferably an independent broker who has experience with small or one-person operations.

"Before you open your doors, you should investigate the insurance needs of your business," warns Bernard Kamoroff in his thorough *Small-Time Operator* (Bell Springs Publishing, Laytonville, California, 1993). With the caution typical of a CPA, Kamoroff lists a half dozen heart-stopping events you can insure against: "Insurance replaces a large, uncertain loss with a small but certain cost—the insurance premium."

Your insurance needs will obviously depend on your business, and choosing coverage is mostly a matter of common sense—though liability coverage is essential. Do you have walk-in clients? Check to see if your homeowner's policy protects you from slip-and-fall lawsuits. Do you bake cookies or repackage imported olive oil? Get a product liability policy to cover the food products you make or sell once you ship them. Have a pile of expensive computer gear? Add riders to your homeowner's policy, or buy special computer insurance (within limits, you can even insure your data). If you write software at home, you probably won't ever poison anyone, but one of your clients might lose a bundle because of a faulty database program. You could get liability coverage, but it might be better—and cheaper—to write a "hold harmless" clause into your contract that specifies a limit on damages you agree to pay in case of electronic accident.

Kamoroff's list includes basic fire insurance, extended coverage, liability insurance, property damage liability, fire legal liability, vandalism and theft coverage, product liability, and business interruption—which pays you your normal income in case your business shuts down because of mishap or ill health. And agents offer packages or "all risk" policies that include some or all of the above. The problem, as usual, is cost.

"Insurance for a small business can really kill you," says Robert Hohler, who runs

CONTINUED ON PAGE 298

BY WILLIAM RODARMOR

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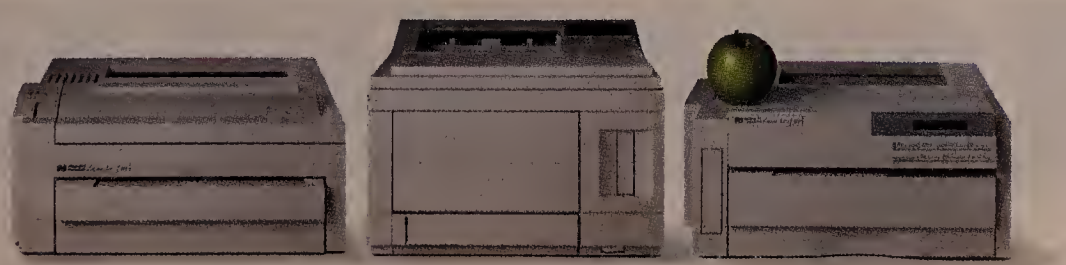

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which is a list of things one pays for in the closing of a loan. I tell clients to set up a receipts folder for any capital improvements, including room additions, pathways, and remodeling. When you sell the house, you will need these records to figure your remaining cost in the house."

If you already have a spreadsheet, use it for tracking your home office expenses. But if you're buying software, check out a low-cost personal accounting package. Intuit's Quicken and Andrew Tobias' Managing Your Money are both popular among home office workers, and they automate many of the more odious bookkeeping procedures.

FIGURING PRORATED DEDUCTIONS

To calculate how much of your rent, mortgage interest, and other home expenses you can reasonably deduct, measure the floor space of your home office and divide that by the total area of your house. If it comes to 12 percent, say, you can deduct 12 percent of the cost of your rent, insurance, mortgage interest, utilities, and repairs and improvements to the property.

Among the expenses that qualify as valid prorated deductions are roof, furnace, and foundation repairs; exterior painting; and the cost of a new driveway or pathway. You can't take a portion of lawn care or landscaping costs, and repairs or renovations to rooms other than the home office do not qualify. You can deduct part of the cost of the paint that you use in the hallway that leads to the home office, but you cannot deduct any of the cost of paint for the bathroom.

These expenses are the ones that are tallied on Form 8829, Expenses for Business Use of Your Home. You can also deduct depreciation costs for your house—but not the land—on this form. The drawback to these prorated deductions is that, since part of your house will be considered business property, it will be subject to capital gains tax when you sell it. There's a way to get around this, though. "Disqualify the home office in the year of the sale by putting the exercise bike in it or letting the kids watch TV in there, so it no longer meets the IRS's exclusivity test," says Attard. "You won't have to declare capital gains tax on the profit of the sale of the home in that year."

Another thing to keep in mind: If you are over 55 and selling your home, in order to qualify for that once-in-a-lifetime exclusion of $125,000 from capital gains tax, you must not use any part of your house as a home office for three years prior to the sale.

WILL YOU GET AUDITED?

Popular wisdom holds that a return with home office deductions is a red flag for an audit. Not true, says Keyser. "I don't think the deduction itself changes your probability of being audited." He says that the IRS will scrutinize any return with substantial expense deductions.

Roberson, who's been audited five times, says home office workers, out of fear of being audited, often forgo deductions that can put $1000 a year or more in their pockets. "An audit isn't so bad," he says. "In most audits I've been through, the auditor has been very fair and considerate. Just don't pull out a shoebox full of receipts."

Two free IRS publications spell out the rules for home offices and offer advice on bookkeeping: *Business Use of Your Home*, #587, and *Taxpayers Starting a Business*, #583. Call 800/829-3676. ✦

Judy Heim is a contributing editor for PC World.

CONTINUED

several businesses at Boston's busy Faneuil Hall Marketplace with his wife, Karen. She markets American Indian crafts, for example, and Faneuil Hall requires that she have liability insurance. "We got one of those standard general contracts," says Robert Hohler, "and in 13 years, we've never had a problem, even though the foot traffic here rivals Disneyland's." But let the buyer beware, he suggests. "If you let some agents sell you a package, it can cost an arm and a leg. The real problem for small businesses is being overinsured, and paying too much for it."

When people leave full-time jobs to start one-person businesses, health coverage can become a major headache. It's expensive, even if you find a group to join for coverage. "I always tell people to get health insurance if they can afford it," says Salli Rasberry, coauthor of the popular *Running a One-Person Business* (Ten Speed Press, Berkeley, California, 1989). "After all, if you fall apart, not much can help your business." She notes that many entrepreneurs are between 30 and 50 years old and "still believe nothing will ever happen to them." When Rasberry herself fell sick, she became a believer; without her group HMO coverage, she says, "I would have been out on the sidewalk wearing a barrel."

Most of us understand illness, but retirement seems too distant to contemplate. Nonetheless, it's short-sighted not to open an individual retirement account (IRA) to shelter as much as $2000 a year. A simplified employee pension plan (SEP) is also easy to set up, and you can invest 13.04 percent of your annual earnings to a $30,000 maximum. Keogh plans (there are several versions) are much more complicated, involve more paperwork and forms, but allow bigger contributions. Overall, however, retirement accounts are among the best reasons to be self-employed. Contributing $100 to your IRA or Keogh can save you as much as $40 in taxes immediately, and the money compounds tax-free until you need it.

On the other hand, says Michael Phillips, coauthor of *Running a One-Person Business*, "the concept of retiring came from a world of salaried work that people hated to do. There is no such concept for leaving work that you like." That may be true, but I still remember my late father's basic faith. A Wall Street investment banker who was a lifelong small-business operator, he liked to say that "Cash in bank giveth that peace which passeth all understanding." ✦

William Rodarmor is managing editor for California Monthly, *the University of California, Berkeley, alumni magazine. He runs a one-person business as a freelance writer, book reviewer, and translator.*

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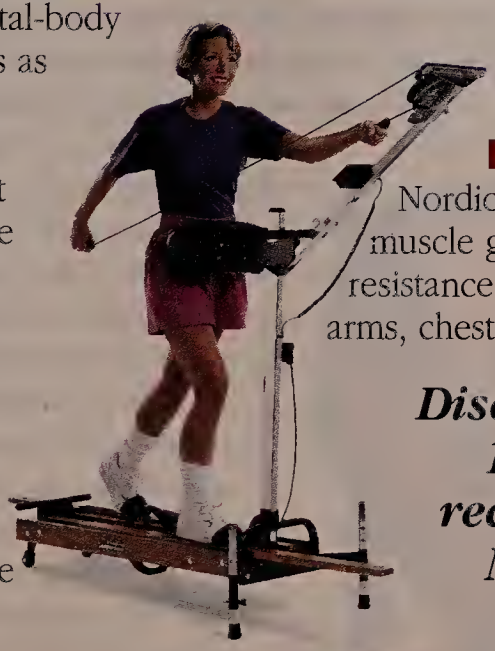

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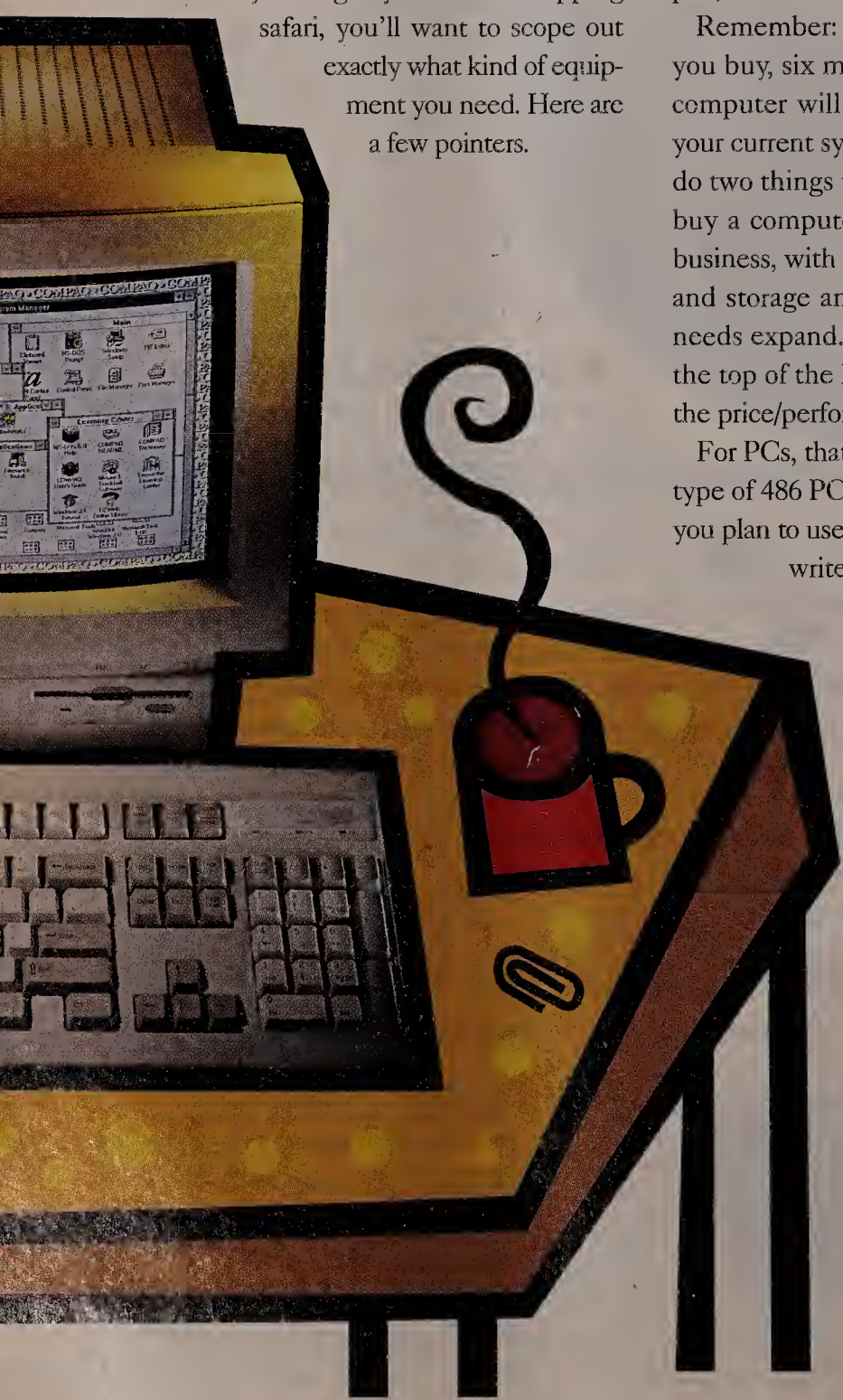
Tools of the Trade

Once armed with a little knowledge, outfitting your business with the right tools is simple.

Here's a guide through the hardware and software jungle, with tips for bagging a few bargains.

HARDWARE

It's a jungle out there, and running a business without the right tools—computers, printers, fax machines, and more—is like wandering into a lion's den, wearing a lamb chop necktie. Fortunately, you have tons of options, and prices are cheaper than ever. But before you begin your office shopping safari, you'll want to scope out exactly what kind of equipment you need. Here are a few pointers.



There are two ways to hunt for hardware. You can take the brute force approach and buy the most powerful computer you can find. Or you can be cunning: Figure out what kinds of jobs you need to do, choose the software that will let you do them, then find a machine that runs the programs you've picked. The first approach is simpler, but the second will save you money.

Remember: No matter what machine you buy, six months later a sleeker, faster computer will come out, and the cost of your current system will plummet. You can do two things to minimize the pain. First, buy a computer that can grow with your business, with room for additional memory and storage and faster processors as your needs expand. Second, buy a system near the top of the hardware food chain, where the price/performance payoff is sweetest.

For PCs, that means a 486, though which type of 486 PC you need depends on what you plan to use it for. If all you want to do is write letters, keep a list of names and addresses, and track expenses, look for a 25-MHz 486SX with 4MB of RAM. Such machines, like Compaq's Presario 425, cost from $1100 to $2000 on the street, depending on disk capacity, bundled software, and other accessories. For Macintosh users, an LC III with 8MB of RAM and a color monitor handles the basics for about $1500.

Windows and Mac users who work with graphics or like to run several programs at once will want a machine with a little more oomph, such as Gateway 2000's popular 4DX-33, a 33-MHz 486DX with 8MB of RAM, or Apple's Quadra 610 with 16MB of RAM. Prices for these beasts range from $1600 to $3000.

Professional accountants, desktop publishers, engineers, or anyone else who performs heavy data or number crunching will want to pull out the big guns—a 66-MHz 486DX2 with at least 8MB of RAM, like Dell's 466/T, or one of Apple's Quadra 800 family. Most 486-66s cost between $2500 and $3500. The Quadras start at around $3800, but many sport extras not found in their PC cousins, like built-in networking, video conferencing, and voice recognition.

GRAPHICS: EASY ON THE EYE

Even a fast computer can look slow when it's redrawing a Windows screen. But it's not the monitor that's causing the slowdown; it's the graphics board inside the PC. If you do a lot of PC graphics work, look for a system with a graphics accelerator board. That same board will also let you control resolution—the number of pixels displayed on screen. While Macintoshes offer one standard screen resolution, most PCs let you choose between 640 by 480, 800 by 600, or 1024 by 768. Higher resolutions let you see more information at once, but they also mean that everything on screen gets smaller. If you want to try 1024 by 768, you'll want a bigger monitor than the standard 14-inch model and a graphics board with a refresh rate of 70 Hz or higher to avoid eyestrain caused by flickering.

STORAGE ROOM WITH A VIEW

A few years ago, a 100MB hard disk seemed as limitless as the Kalahari Desert. Now it feels as cramped as a New York subway car. One of the culprits is Windows,

BY DANIEL TYNAN

which sucks up 15MB to 20MB of space all by itself. Add a word processor, spreadsheet, database, and some data files, and you can kiss most of that 100MB good-bye. A similar rule applies for users who work with graphics: A typical 4-by-5-inch color image can consume more than 5MB. To be safe, buy a system with at least 200MB to 250MB of hard disk space.

Even good hard disks go bad, and if you don't back up your disk religiously it will take your data with it. For $200 to $600, tape backup drives like Colorado Memory Systems' Jumbo 250 make backing up big disks a breeze.

While you're adding disk drives, be sure to save room for a CD ROM drive. It's probably worth the extra few bucks to go for a double-speed model, like an NEC MultiSpin or a Texel DM-3028 drive, especially if you'll be dealing with large graphics files. More and more software is being shipped on CD ROM disks, from popular programs like CorelDraw to reference titles. Prices for CD ROM drives start at $250 and head north in a hurry.

NOTEBOOKS: MOVING TARGETS

Some people never leave the office; others take it with them when they go. If you're a traveling professional, consider making a notebook your desktop machine and buying a spare monitor and keyboard for the office. Machines like Toshiba's T1900 and Apple's PowerBook Duo 250 pack as much power as computers four times their size, with prices starting at about $2000 for monochrome and $3000 for color. Key factors to consider in a notebook: weight (look for less than 6 pounds), screen quality, and battery life. If you travel cross-country frequently, look for at least 4 hours of battery life and strong power-saving features.

TRACKING PRINTS

Computers and printers go together like Tarzan and Jane. There are essentially three species: dot matrix printers, ink jets, and lasers. For about $250, a 24-pin dot matrix model like Epson's LQ-570 Plus is great for cranking out personal correspondence and printouts for your files—and the only choice for printing multipart carbon forms and extrawide documents.

If you need to create documents dressed to impress, ink jets like Apple's StyleWriter II are a better choice, offering near-laser-quality text and graphics for $250 to $600. Traveling professionals can opt for portable models like Canon's BJ-10ex, which tip the scales at a scant 4 to 7 pounds. Need to produce color charts and graphs? For less than $900, HP's DeskJet 550C gives you all the hues that are fit to print. But remember: Ink jets are slower than lasers, output sometimes smudges, and print quality varies depending on the paper you use.

For fast, sharp output, nothing beats a laser. Personal printers such as Hewlett-Packard's LaserJet 4L cost from $600 to $1000, and many can be shared by a few users, making them an economical choice for small offices.

Finally, if high-quality desktop publishing is part of your business plan—or you use a Mac and want laser output—a PostScript laser is a must. For less than $1000, a machine like Texas Instruments' microWriter PS23 ensures that the document you create looks the way you planned when it comes back from the print shop.

INESCAPABLE FAX OF LIFE

Besides the telephone, your best connection to the outside world is a fax-modem. Fax-modems let you swap files from one computer to another, log on to public E-mail services like CompuServe, tap into a wealth of online information, and, best of all, transmit files directly from your hard disk to fax machines, or vice versa.

Many systems come with a fax-modem already built in. If yours doesn't, less than $100 can buy one that sends data at 2400 bps and faxes at 9600 bps. Faster units that operate at speeds up to 14,400 bps, such as Hayes's Optima 144 + Fax144, typically cost $400 or more.

The biggest drawback to a fax-modem is that it won't let you send hard copies—only files from your computer. While you could get around this problem by installing a scanner, which translates images from a printed page into a format your fax-modem can handle, it's easier to simply buy a personal fax machine. Models using rolls of uncut thermal paper start at around $300; plain-paper fax machines cost $700 and up.

COPY CENTRAL

Photocopies are as common to offices as coffee machines—and just as essential. Eventually you'll need to make copies of important documents (like contracts) or magazine articles (like this one) for your files. Unless you live next door to the local copy shop, a personal copy machine can save you time and money. For $400 you can buy a letter-size desktop copier; models supporting larger paper sizes and automatic paper feeders cost $1200 or more. Alternatively, some fax machines double as copiers, though the quality of the copies may not be high enough for your needs.

ACCESSORIES AFTER THE FACT

New computers and old wiring often don't mix. If you work in an older building, you'll want a power strip with a built-in surge protector ($50 or less) or, better yet, an uninterruptible power supply ($100 to $400), which gives you enough juice to shut down your computer safely even during a blackout. A $50 glare protector will keep you from squinting when the sun comes streaming through the blinds. If you buy a CD ROM drive, you'll probably want to plunk down $150 or more for a sound board and speakers. And if you do a lot of mailings, spending $200 on a separate label or envelope

SAVING ON HARDWARE AND SOFTWARE

THE HARD STUFF

Yesterday's Technology Today
Unless you're running some monster software like Windows NT or a CAD program, you probably don't need a Pentium. Midrange 486s offer the best balance of speed and price.

Brand X
Smaller, lesser-known companies generally offer the best prices. They also go out of business with greater frequency, which means there may be no one around to fix your PC if it breaks. Before you buy, check with the vendor's local Better Business Bureau, Department of Consumer Affairs, and local computer user groups to see if the company has had problems filling orders or meeting customer needs. If you're shopping by mail, contact the regional U.S. Postal Inspector or the Direct Marketing Association in New York (212/768-7277).

Build Your Own
Systems integrators can assemble a computer cheaply from component parts. Just look in the classified advertisement section of any local computer tabloid. The same rules apply here: Research the company thoroughly and be sure to get its service and support policies in writing.

"Previously Owned" PCs
Buying a used PC is like buying a used car—it helps if you know how to fix it. For the technologically savvy, used machines are the cheapest way to go. The Boston Computer Exchange will fax you market prices for used PCs; call them at 617/542-2345 ext. 300.

Plastics
Finally, when buying hardware or software, always pay with a credit card, or at least by COD. That way you can cancel the charges if the products you've ordered come in DOA—or not at all.

THE SOFT STUFF

Never Buy Retail
Impulse buys at the local PC store are tempting, but be strong: The best deals are from mail-order companies or superstores like Egghead Software and CompUSA.

Bundled Buys
You get the best breaks on software when you're purchasing hardware. Most new computers bought through mail order come bundled with software at no additional cost. And if you're buying your system from a local dealer, a little negotiation can often net you extra software as well.

Competitive Upgrades
Some vendors will practically give you a copy of their software if you're upgrading from a competitor's product. Check with the vendor to see what qualifies for a competitive upgrade. You may be surprised: An old piece of software you have around the house could save you hundreds of dollars on the program you really want.

Integrated Apps
Integrated programs typically combine a word processor, spreadsheet, data manager, and more into one easy, low-cost package. If you're not a power user, an integrated app may be all the software you need.

Suite Deals
Software suites are like integrated applications on steroids: Instead of one low-power app, you get three or four full-fledged ones for a fraction of their combined cost.

Sharing the Wares
Shareware—programs distributed free on a tryout basis—are inexpensive, and many are surprisingly powerful. Best of all, if you don't like the program, you don't have to pay. Shareware programs can usually be found on electronic bulletin boards and online services such as CompuServe and America Online. *—D. T. and J. H.*

printer may be simpler than feeding your laser or ink jet by hand.

Once armed with a little knowledge, outfitting your business with the right tools becomes much simpler. And not only will you know your way around the thickets and vines of office hardware, but you might even manage to bag a few bargains.

SOFTWARE

Every business runs on software. The trick is to sort through the bewildering array of programs out there to find the ones that will make you most productive. No matter how specialized your business is, you'll almost certainly need software to help you manage words and numbers and keep track of relationships and transactions. In the following sections—Words, Numbers, and Information Managers—we'll look at some of the best programs that conquer the basics with finesse, and we'll offer advice on picking the right software, whether PC or Macintosh based (see "Why a PC Is Better Than a Mac...And Vice Versa").

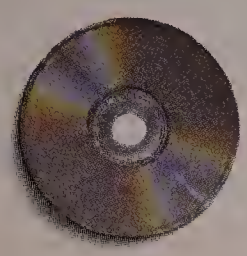
WORDS

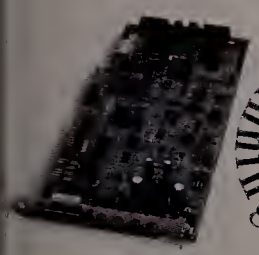
Today's word processors are among the best programs available. All boast Wysiwyg (What You See Is What You Get) features, which means documents will look in print the way they look on screen. Fonts and paragraph formatting, spelling and grammar checkers, thesauruses, style sheets, macros, outlining, tables, and the capability to create form letters and perform mail merges with database documents and files—these are all standard fare.

The leading Windows word processors—WordPerfect for Windows, Microsoft Word for Windows, and Lotus Ami Pro—all feature macro-based templates that make producing business documents a snap. A business-letter template, for example, prompts you to fill in dialog boxes with information about yourself and the person to whom you are writing. Type the body of the letter, check your spelling, click *Print*, and presto—out pours a perfectly formatted document. Other useful templates include fax cover sheets, proposals, invoices, memos, outlines, and press releases. Also,

BY JOE HUTSKO

In desperation I asked my friend about Multimedia. She said it's simple. To turn your computer into a multimedia funhouse you need an award-winning Pro AudioSpectrum™ 16 sound card. Sounds great I said. But she wasn't done. I should also get a great CD-ROM drive and a pair of amplified speakers so I can walk through the jungle, talk to Columbus or even explore a haunted house. And all this stuff should be easy to use and set up in my computer automatically. So I asked—where the heck am I going to find all this in one affordable package?





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ALL-IN-ONE WONDERS

If your software needs are basic—you're new to computers or your tasks are simple—consider buying an integrated package. Integrated software combines key programs—such as a word processor, a spreadsheet, and a database—into one inexpensive, do-it-all package. The constituent programs are typically less powerful than their full-fledged counterparts, but instead of buying, installing, and learning three or more programs, you deal only with one. Plus, for as little as $49, you get an introduction to the world of software.

If you find later that your integrated package is holding you back, you can always upgrade to the industrial-strength word processor, spreadsheet, or database of your choice. Some of the more popular integrated packages include ClarisWorks (Windows and Mac), Lotusworks (DOS), Microsoft Works (Windows and Mac), and PFS:WindowWorks.

SUITE TALK

If you're setting your sights higher and want separate, full-featured programs, check out a suite. Suites combine three or more programs for little more than the retail price of any single program in the bundle. Price is only part of the allure, though: All the programs in the suite are fine-tuned to work seamlessly with one another—for example, in Microsoft Office, you can use your mouse to drag data directly from Excel to Word.

In Lotus's SmartSuite for Windows you get Ami Pro, 1-2-3, Approach, Freelance Graphics, and Organizer (word processor, spreadsheet, database, presentation graphics, and personal information manager). The Microsoft Office suites for both Windows and Macintosh offer mix-and-match combinations of programs, including Word, Excel, Access, PowerPoint, and Mail (word processor, spreadsheet, database, presentation graphics, electronic mail). Borland's suite includes the Windows versions of WordPerfect, the Quattro Pro spreadsheet, and the Paradox database. —*Joe Hutsko*

all three programs feature icon-based tool bars for quick access to drawing and envelope tools, and single-click formatting options such as bullets and indents.

So if you're sold on Windows, which word processor is for you? If you're already familiar with WordPerfect for DOS (the most popular word processor in the world), your first instinct is probably to upgrade to WordPerfect for Windows. That's a fine choice, especially if you do much work with long documents, but consider the other candidates before you leap. For instance, if you plan to do some desktop publishing (DTP), you'll appreciate Ami Pro's multicolumn newsletter templates, its capability to produce attractive charts, and a slew of other high-powered DTP functions. Another plus: Ami Pro works particularly well with 1-2-3 for Windows, Freelance Graphics for Windows, and other fellow Lotus products.

No matter how specialized your business is, you will almost certainly need software to help you manage words and numbers.

Microsoft's entry, Word for Windows, is no slouch either, and it features seamless integration with other Microsoft programs such as Excel and Mail. And Word for Windows is an ideal companion for *Bookshelf*, a multimedia CD ROM reference library containing seven reference works, including *The American Heritage Dictionary* and the *Hammond Atlas*. Select a word and click the Bookshelf icon in Word's tool bar to search for more information.

If you're more comfortable with DOS, WordPerfect 6.0 for DOS's sleek Windows-like interface and drawing and spreadsheet tools make it the top choice—at least until a better version of Microsoft Word for DOS comes along. For professional writers and editors who are willing to put up with a somewhat unfriendly interface in exchange for powerful search-and-replace features and the ability to handle very long documents with finesse, XyWrite, by The Technology Group, is a strong choice.

The top Mac word processor, Microsoft Word, sports many of the features found in its Windows sibling. It offers the most extensive mail merge capabilities of the lot, does charts well, handles huge documents with ease, and integrates nicely with Excel. Nisus, by Nisus Software, lacks Word's elegant interface, but its multiple-clipboard feature is handy for people who do lots of editing and rearranging. It's also the only program in the group capable of phonetic word searches.

WordPerfect for Macintosh, despite its clumsy interface, is the only Mac word processor that can create an index based on a separate file list—a godsend for catalog or directory publishers—and it offers the most precise placement of graphics. Claris's MacWrite Pro imports the widest range of graphics file formats. Its built-in drawing tool is the only one in the group that feels like part of the program rather than an afterthought. Finally, WordStar's WriteNow is perfect for older Macs with very little RAM. It's fast and easy to use and offers style sheets and good correction tools, but it's suited for strict word processing tasks only; no tables or indexing here.

NUMBERS

The bottom line in any business is numbers. And when it comes to manipulating figures, nothing offers more power and flexibility than a spreadsheet program. In fact, spreadsheets are indispensable tools throughout corporate America, where budgets, sales projections, and complex analyses of business figures are a firm's lifeblood.

In small businesses, however, where much of the number crunching is confined to tracking office finances, you may be better off with a small business accounting package (more about these later). If you'll be doing more than basic accounting, though, or you simply want full-fledged numerical might, there are spreadsheets aplenty to choose from.

▶ **Spreadsheet Picks.** All of today's spreadsheets handle the basics, such as tracking budgets and expenses, monitoring inventories, and keeping tabs on project deadlines. They differ in their ease of use,

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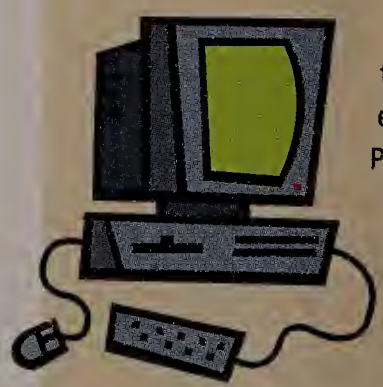
WHY A PC IS BETTER THAN A MAC...AND VICE VERSA

THE PC WINS

I choose ties, watches, even eyeglasses based on their style and "personality." I choose computers based on price, performance, and software availability. I use a PC.

1. PCs are cheaper. Despite Apple's recent price slashing, PCs still have the big edge. A 33-MHz 486DX PC with 8MB of RAM, a 220MB hard drive, and a 14-inch color monitor costs as little as $1200; a comparable Apple Centris usually runs well over $2000.

2. PCs are faster. In recent tests, *InfoWorld* found that PCs left Macs in the dust when performing standard spreadsheet and database functions. Even in the graphics arena (a reputed Mac bailiwick), the results were mixed: PCs won some categories, Macs others.



3. Software, software, software. Pick an application—any application—and it's available for the PC. With the Mac you don't get nearly the variety. You say you want a database or a presentation package for the Mac? Choose from one or two. For a PC? You'll quickly run out of fingers and toes.

4. PCs don't insult my intelligence. My PC doesn't murmur sweet nothings when I turn it on or ask me to name my hard drive. It doesn't even have a trash can where I can dispose of files (I simply press the <Delete> key). If I want cute, I'll get a puppy.

5. Save me from rodents, please. Mice are nice, but Macs get carried away. To eject a floppy disk from a Mac, you drag an icon representing the disk across the screen and drop it into the trash can. On a PC you push a button on the drive door.

6. You're not locked into one vendor. You can buy a Macintosh from any company as long as its name begins with the letters A-P-P-L-E. I can get a PC from anyone, from ALR to Zeos. And that means somewhere I'll find a PC with the exact features I want.

7. Choice of operating systems. Apple gives you System 7. PCs give you DOS, Windows, OS/2, Windows NT, Desqview, GeoWorks, and more. Is this confusing? Sure, but freedom always is.

8. Better magazines. PC users get to read *PC World*. Need I say more? —*Steve Fox*

Steve Fox is a senior editor for PC World.

THE MAC WINS

I can use any personal computer in the world. Here's why I choose a Mac for my work and recommend Macintosh to friends.

1. Macs are not scary. By comparison to Macintosh, Microsoft Windows is a do-it-yourself project. Mac users don't have to delve into the darkest reaches of their systems to add hard drives, switch monitors, plug in a modem, or change software. Macs are easier to configure—and to fix if something goes wrong.

2. Macs are connectable. Connecting one Mac to another, or several Macs to one printer, is easy because networking is built in.

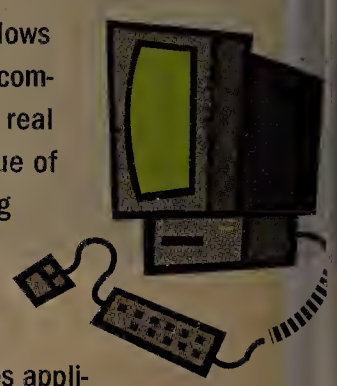
3. Macs have great software. Microsoft has a wonderful suite of applications, and several other vendors have strong offerings too. Graphics on the Mac are better, and unlike Windows programs, most Mac applications really do work the same way—learning one means you're three-quarters of the way to knowing them all.

4. Macs are compatible with PCs. Forget the claims that Mac can run Windows applications—affordable Macs aren't fast enough to do so practically. But with inexpensive additional software, Macintosh has no trouble running most DOS applications or reading from and writing to PC floppy disks.

5. Mac means multimedia. The best educational and multimedia programs are on the Mac. And every Mac has some level of multimedia support built in—sound is already there.

6. File names mean something. If you've written a letter to your accountant on December 13, you could call it 12/13/93 Letter to Accountant. On a PC, you're limited to 11 characters and a period; you'd call it something like ACCNTLET.DEC.

7. Macs are affordable. You can buy a Windows PC for a bit less, but that's what you get: less computer. Everyone knows raw speed isn't the real measure of productivity. And what is the value of your time? Such "soft dollar" costs as training add up.



8. Macs believe in icons. Want to discard a file? Drag it to the trash can. Need to open a file? Double-click an icon. Its approach makes applications easy to install—and uninstall. Uninstalling a Windows application is a trick worthy of David Copperfield. —*David Coursey*

David Coursey is editor of P.C. Letter.

analytical power, database and layout capabilities, charting, and graphics handling. Macintosh owners get three leading choices: Claris Resolve, Lotus 1-2-3, and Microsoft Excel. For new users, Claris Resolve is the easiest to grasp, and its interface is similar to MacWrite Pro's. Nonaccounting types will benefit from its 150 common accounting functions, presented in a single dialog box. There's no support, however, for multiple-sheet documents; and while modifying graphics is easy, importing them is not.

Users switching from DOS to the Mac will feel at home with 1-2-3 for Macintosh. It's the only Mac spreadsheet here that offers multisheet documents and in-cell editing, which enables you to type numbers directly into the region of the worksheet where they belong. Editing and resizing graphics are simple operations, although 1-2-3 lacks some of the conveniences the other two spreadsheets offer, such as drag-and-drop editing.

The best-selling Mac spreadsheet, Microsoft Excel, is also the most powerful. Though its tool bar is overloaded, its Workbook feature—which lets you combine spreadsheets, charts, and macros in easy-to-manipulate groups—is a boon to serious

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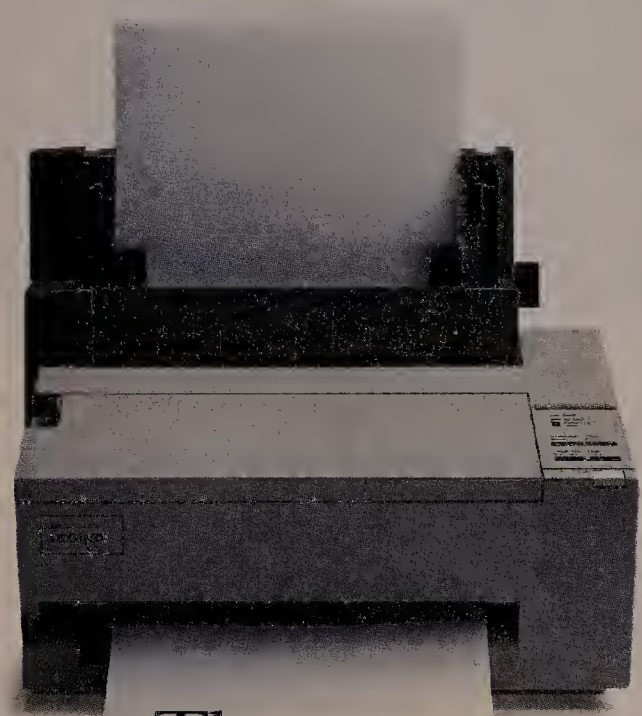

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UPGRADE TO BUSINESS CLASS: THE NEW IBM EXECJET II.

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users. And Excel handles Excel for Windows files with aplomb.

On the PC side, 1-2-3 dominates the DOS market with some competition from the very able Quattro Pro 4.0. If you're familiar with a DOS spreadsheet and you're satisfied, stick with what you've got. But if you want more functionality for less effort, the new crop of Windows spreadsheets—Quattro Pro 5.0 Workgroup Edition, 1-2-3 release 4.0, and Microsoft Excel 4.0—just might be the best argument around for moving to Windows.

Excel was the first fully functional Windows spreadsheet, and it has dominated the field for several years with its strong array of analytical features and its Wizards to step you through complex processes. On the downside, its 2-D design can make cross-spreadsheet formulas and file handling troublesome. As in Excel's Mac version, Workbooks make it easy to pull several worksheets into a single table of contents.

Borland's Quattro Pro for Windows offers superior graphics and charts. It employs an innovative 3-D notebook structure complete with tabs for naming worksheet pages, and its graphics talents make it quite acceptable for presentations.

Lotus's first Windows entry couldn't keep up with Excel or Quattro Pro, but release 4.0—with in-cell editing and enhanced commands—is gaining converts. Worksheet Tabs, which are also found in Quattro Pro 5.0 for Windows Workgroup Edition, let you group spreadsheets and make it easier to take advantage of 1-2-3's true 3-D layering technology.

One other option is Lotus's Improv for Windows. Improv lets you rearrange a worksheet by just dragging categories across the page, making it easy to view data from different perspectives. It also features plain-English formulas. For marketing consultants, financial analysts, or new users with no preconceived idea of how a spreadsheet should work, Improv for Windows may be the perfect choice.

▶ **Accounting Programs.** Dedicated accounting programs can ease the headache of organizing your business finances. For one- or two-person offices, accounting programs that use a checkbook metaphor often fill the bill. The most popular is Intuit's Quicken (Mac, DOS, and Windows). Although Quicken contains the same elements as most business accounting programs, it's really a personal-finance program. Intuit's QuickBooks feature, designed for small businesses, handles check disbursements, invoicing, and accounts receivable. The QuickPay add-on module handles payroll. Other popular checkbook accounting programs include MECA's Managing Your Money (Mac and DOS) and Computer Associates' Kiplinger's CA-Simply Money (Windows).

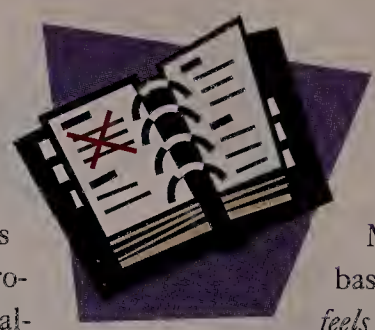
For businesses with two to ten employees, there's Teleware's Mind Your Own Business (M.Y.O.B.) for Windows, DOS, and Macintosh. M.Y.O.B. is a full-featured accounting system that covers general ledger, accounts receivable, accounts payable, and inventory. For Windows, there's Microsoft's Profit, Teleware's BestBooks, and DacEasy's Instant Accounting.

For offices with ten or more employees, Peachtree Software offers packages for both PCs and Macs. Its general ledger, accounts receivable, and accounts payable modules are industrial-strength winners.

INFORMATION MANAGERS

A personal information manager, or PIM, can be a lifesaver. Most contain four key components: a name and address database, a calendar, a to-do list for tracking tasks and projects, and a notepad for jotting down ideas and project details. Some PIMs also include a phone log for tracking phone calls, as well as an auto-dialer that works through your modem. All good PIMs let you print reports and export data to other programs, such as word processors for mail merges. If you don't need all those features, consider buying just a dedicated address book or calendar program.

An all-in-one PIM reduces duplicate work by letting you link contact, schedule, and to-do items. For DOS, Individual Software's AnyTime or Borland's Sidekick (the granddaddy of PC PIMs) are good choices.



For Windows users, the choices abound. Lotus Organizer wins in the categories of good looks and ease of use. Modeled after popular paper-based organizers, Lotus Organizer *feels* familiar from the get-go. The Anchor creates links between six key sections: Address, Calendar, To Do, Notepad, Anniversary, and Planner.

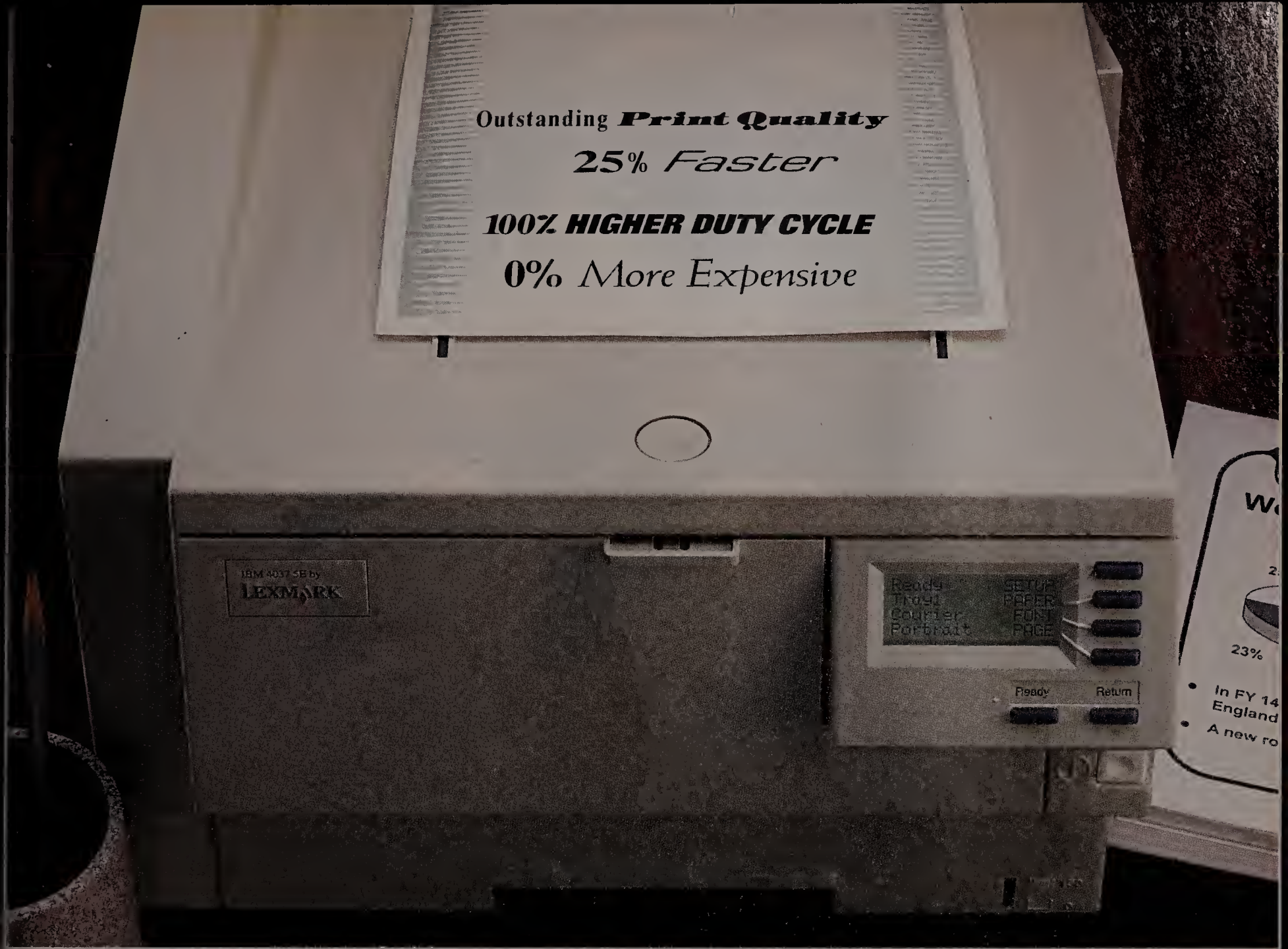
Arabesque's Ecco, on the other hand, takes an outline approach to keeping you in order. Its clever Shooter feature embeds an icon in the title bar of other active Windows programs and lets you shoot selected information from other programs directly into Ecco with a single click. Other Windows PIMs to consider include 1Soft's Above & Beyond, Franklin Quest's Ascend, Jensen-Jones's Commence, Okna's DeskTop, Polaris Software's PackRat, Prisma's YourWay, and Richmond Technologies and Software's Maximizer.

A good contact management program can make the difference between merely staying in touch and staying in business.

On the Mac side, Aldus's TouchBase Pro and DateBook Pro together form a tightly integrated PIM system. For tracking contacts only, Portfolio's Dynodex for Windows and Macintosh is the best of the breed, featuring customizable fields, phone dialing and logging, heavy-duty mail merge, and loads of customized output layouts.

If your livelihood depends on maintaining contact with clients, take a look at specialized contact management programs such as Whiskey Hill Software's ClienTrac (Mac), WindoWare's Contact (Windows), and Contact Software International's Act (Windows and Mac). Each program ties schedule and project events to client records and provides regular reminders for contacting clients by phone, fax, letter, or in person. Given the competitive nature of business today, this sort of attention to detail can make the difference between staying in touch and staying in business. ✦

Daniel Tynan is a contributing editor for PC World. *Joe Hutsko is a freelance writer based in San Francisco.*



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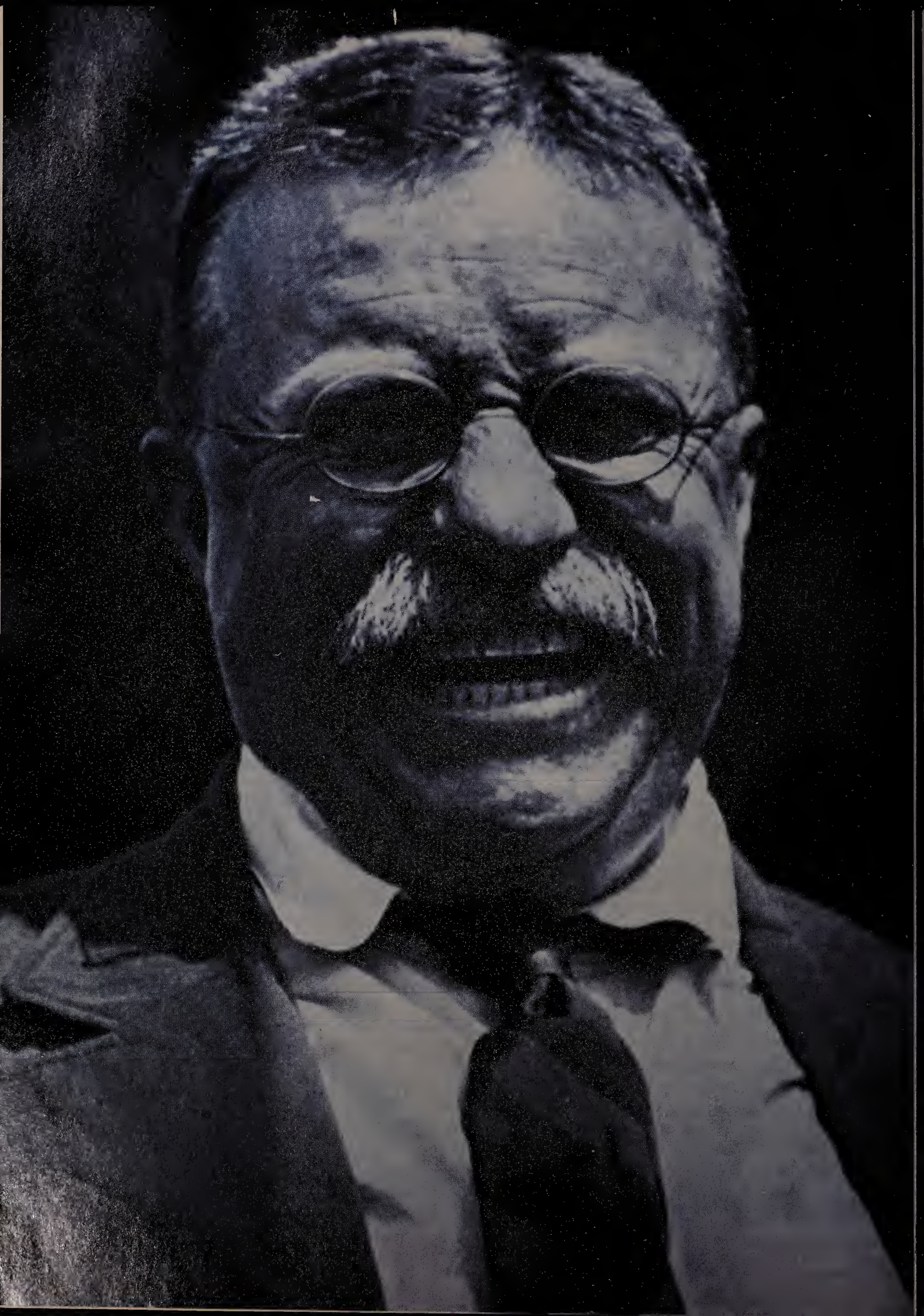

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Information, Please

Help for entrepreneurs is just a phone call away. Get started with this resource guide to expert advice.

You don't have to make the leap from employee to entrepreneur all by yourself. You can turn to any number of professional and government organizations and online services to help you establish your office. And much of the help that's available is inexpensive or even free. Read on for a sampling of some of the best resources to get you started.

ORGANIZATIONS

▶ **Small Business Administration (SBA).** As taxing a relative as he is, Uncle Sam can be generous. The SBA provides inexpensive management assistance to small, privately owned businesses. 800/227-5722

The SBA has a library of over 100 business booklets (most under $2), including *How to Start a Home-Based Business*, and three videos, including the $39 *Home-Based Business: A Winning Blueprint*. List of publications 202/205-6743; videos 202/205-6665

▶ **Small Business Development Centers.** The 500-plus SBDCs provide counseling and training to prospective and existing business owners. 800/785-8632

▶ **Business Information Centers.** The ten regional BICs offer high-tech help to small businesses. The SBA Answer Desk will guide you to a nearby office. If you have a modem, try the BIC bulletin board: 2400 bps 800/859-4636; 9600 bps 800/697-4636; Answer Desk 800/827-5722

▶ **Chamber of Commerce.** These local organizations provide guidance on securing community and legislative support, and some offer free start-up kits for new businesses. Check your phone book or call the U.S. Chamber of Commerce. 202/659-6000

▶ **National Federation of Independent Business.** With over 500,000 members, the NFIB is the largest small-business advocacy group in the United States. 202/554-9000

▶ **Service Corps of Retired Executives.** This volunteer organization of more than 13,000 retired business professionals provides free advice and assistance. There are approximately 400 SCORE chapters in 750 locations nationwide. 202/205-6762

▶ **American Institute for Small Business.** This organization publishes books, videos, software, and educational materials, including the two-volume *How to Set Up Your Own Small Business* to help you map your entrepreneurial course. 800/328-2906

▶ **Government Printing Office.** For a copy of the GPO's *Starting and Managing a Business From Your Home*, send $1.75 to Superintendent of Documents, GPO, P.O. Box 371954, Pittsburgh, PA 15250. 202/783-3238

HELP LINES

▶ **Small-Business Help Line.** Available through NFIB, individual messages run about 4 minutes and include detailed references on operating a small business. Cost is about 95 cents per minute. 900/820-6342

▶ **Small Business Answer Desk.** The SBA Office of Advocacy's toll-free hot line is a great information service. 800/827-5722; in Washington, D.C. 202/205-7701

▶ **IRS.** Save on taxes by calling ahead of time. If the person answering can't help you, a specialist can call you back. Another number provides tax forms and publications such as the *Self-Employed Retirement Plan*. The IRS also gives free small-business workshops nationwide. Advice 800/829-1040; forms and publications 800/829-3676

▶ **Social Security Administration.** You can get a detailed printout of SSA records of your earnings and projected benefits at retirement. 800/772-1213

ONLINE SERVICES

To access an online service, all you need is a computer, a phone line, and a modem. These forums let you tap into a universe of information, giving you access to electronic mail, software, electronic magazines and books, databases, and other home-based entrepreneurs. Prices vary for each service.

▶ **CompuServe.** This service offers access to most major business databases and research sources, as well as product support and news on updates from most hardware and software vendors. The Working From Home Forum and the Entrepreneur's Forum provide information on tax laws and other legal issues, and allow you to converse with fellow small/home office professionals. 800/848-8199, 614-457-8685

▶ **America Online.** Alongside standard online fare, AOL hosts the Microsoft Small Business Center, which carries business advice and real-time seminars. You can also hook up with the SBA, the U.S. Chamber of Commerce, the NFIB, and the U.S. Trademark and Patent Office. 800/827-6364

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▶ **GEnie.** General Electric's online service provides a smattering of business help—classes, financial planning, and so on—as well as a wealth of personal/home services. 800/638-9636

▶ **Prodigy.** Prodigy markets itself as a family service, specializing in education and entertainment. Basic service is $14.95 a month; for an extra $14.95, the Strategic Investor provides unlimited access to financial information. 800/776-0845. ✦

Leslie Crawford is a freelance writer based in San Francisco.

BY LESLIE CRAWFORD

"Thanks to CorelDRAW™, my sales are as hot as my salsa!"

Let's face it ... I'm pretty hot in the kitchen, but I'm no artist. And with a small business like mine, both time and money are in short supply. That's why you can't beat the value and ease of CorelDRAW 3. With hundreds of fonts, tons of clipart and lots of fast and fun special effects, I've got all the right ingredients to create sizzling menus, appetizing ads, business cards, labels, signs and more...everything I need to be a real success.

CorelDRAW 3 also includes CorelCHART – to let me chart my monthly sales; Corel PHOTO-PAINT, to add a dash of spice to photos; and CorelSHOW, a presentation package that makes it a cinch to design mouth-watering multimedia menus for my new corporate clients.

With all these features, CorelDRAW 3 is the perfect partner for a small business like mine! Thanks to this fast, fun and easy-to-use software – *my sales are as hot as my salsa!*

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COREL

KUR-0032

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FAX SURVEY

Win a Compaq Presario

Fax in your opinions to enter a drawing for a Compaq Presario 486 PC.

Which articles in this *PC World* Small Office/Home Office special report are valuable to you? Do you use PCs in small office or home office? Let us know by filling out the questionnaire below. Fax in your response and you'll have a chance to win a Compaq Presario 486 PC.

HOW TO ENTER: Fax your completed questionnaire, along with your name and phone number, to *PC World* at 415/267-1779. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to SOHO Fax Survey, Box 12-HO, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than December 31.

HOW TO FILL OUT THE FORM: FOR BEST RESULTS, PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Clearly print your name (use block capital letters), fax number, ZIP code, and daytime phone number at right; fill the appropriate circle for each digit of your phone number. Below, fill the circles for the answers that apply to each article you read. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

	Did you read it?		Value to you?				
			Least				Most
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
Making the Small Office Work (page 282)	○	○	○	○	○	○	○
Best Voice Forward (page 290)	○	○	○	○	○	○	○
Taxes and the Home Office (page 293)	○	○	○	○	○	○	○
Tools of the Trade (page 300)	○	○	○	○	○	○	○
Information, Please (page 312)	○	○	○	○	○	○	○

How interested are you in the following types of articles?

	Least 1	2	3	4	Most 5
PC product news	○	○	○	○	○
Tips on using hardware	○	○	○	○	○
Tips on using software	○	○	○	○	○
PC-related case studies	○	○	○	○	○
Technical explanations	○	○	○	○	○
PC product reviews	○	○	○	○	○
Consumer protection info	○	○	○	○	○
Info on running small businesses	○	○	○	○	○

Do you use PCs in your...? (Mark all that apply.)

○ Home office
○ Home, not in an office
○ Office away from home
○ Don't use PC

If you work out of a home office, is it a...? (Mark all that apply.)

○ Primary place of business for yourself ○ Site for telecommuting to your main office
○ Office for bringing work home ○ Primary place of business for second job

Does your company buy the PC and PC-related products in your home office? (Mark only one.)

○ Yes, all ○ Yes, some ○ No

■ **If you work out of a HOME office or for a company with 99 or fewer employees, please answer the following questions about the PC YOU USE FOR WORK. But if you work for a company with MORE than 99 employees and you use a PC at home, please answer the following questions about the PC YOU USE AT HOME.**

What type of PC do you use?

○ Desktop ○ Laptop ○ Notebook ○ Hand-held

Is this PC a

○ 486 ○ 386 ○ 286 ○ Mac ○ Other (specify) _____

Which PC software do you use regularly? (Mark all that apply.)

○ Word processor ○ General-purpose communications ○ Personal finance or tax
○ Spreadsheet ○ Electronic mail ○ Integrated software
○ Database ○ Remote control software ○ Application suite
○ Presentation graphics ○ Online services ○ Educational software
○ Draw/image software ○ Personal information manager ○ Entertainment/games
○ Desktop publishing ○ Accounting/finance ○ Other _____

Which operating system do you use? (Mark all that apply.)

○ Windows ○ DOS ○ Macintosh ○ Other (specify) _____

Which of the following peripherals and office machines do you use or plan to buy in the next 12 months? (Mark all that apply.)

	Use	Plan to buy		Use	Plan to buy
Modem	○	○	PC-based voice-mail	○	○
Dot matrix printer	○	○	Scanner	○	○
Ink jet printer	○	○	CD ROM drive	○	○
Laser printer	○	○	Sound board	○	○
Fax board	○	○	Answering machine	○	○
Fax machine	○	○	Copier	○	○

How important do you consider the following when selecting a PC?

	Least 1	2	3	4	Most 5		Least 1	2	3	4	Most 5
Performance/speed	○	○	○	○	○	Service and support	○	○	○	○	○
Upgradability	○	○	○	○	○	Price	○	○	○	○	○
Bundled software	○	○	○	○	○	Mfr.'s reputation	○	○	○	○	○
Ease of use	○	○	○	○	○	Energy efficiency	○	○	○	○	○

Which of the following best describes your level of involvement in the purchase of PCs and PC-related products for your office?

○ I do it all ○ I have major involvement ○ I have no involvement
○ I have decisive involvement ○ I have occasional involvement

How much is budgeted for PCs and PC-related products for your office for the next 12 months?

○ Less than $2000 ○ $11,000–$49,999 ○ $100,000+
○ $2000–$10,000 ○ $50,000–$99,999

If you run a business out of your home, how many people do you employ, excluding yourself?

○ 0 ○ 1 ○ 2–3 ○ 4–6 ○ 7+

If you work somewhere else, how many people does your company employ?

○ 1–9 ○ 10–24 ○ 25–49 ○ 50–99 ○ 100–999 ○ 1000+

How many PCs, including laptops and hand-helds, are used in your office?

○ 0 ○ 1–5 ○ 6–15 ○ 16–25 ○ 26–49 ○ 50–100 ○ 100+

What is your job level?

○ Executive management ○ Middle management/supervisor ○ Retired/unemployed
○ Senior management ○ Nonsupervisory ○ Self-employed

In terms of PC skills, would you describe yourself as

○ Novice ○ Intermediate ○ Experienced

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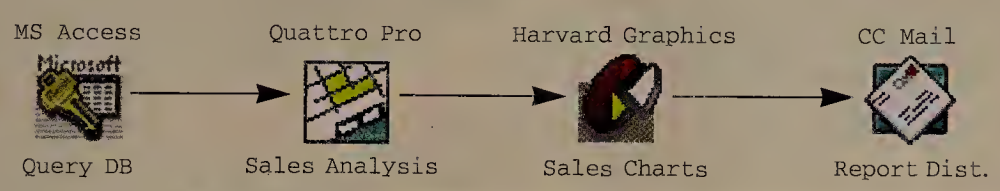
If you're tired of playing matchmaker to software applications (even ones from the same vendor), you'll be pleased to hear this. There is a product that does it for you, now. Prodea Synergy™ makes the programs you already have, and what you've built with them, work together. A few points and clicks, and applications will exchange just about everything but valentines.

Mr. R. Lee Allen of Schering-Plough, a company already using Prodea Synergy, put it less romantically although no less enthusiastically. "It's not like anything out there before. It's more than OLE or DDE. It transcends both languages and APIs."



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You should also know that what you build is easy to pass on to others, without worrying about hot links, paste links or file location. Prodea Synergy runs under Windows,™ costs $495 and has a 30-day money-back guarantee. For a limited time you also get a $200 introductory cash rebate. Call us at 1-800-PRODEA-1. Your software programs will never look at one another the same way again.

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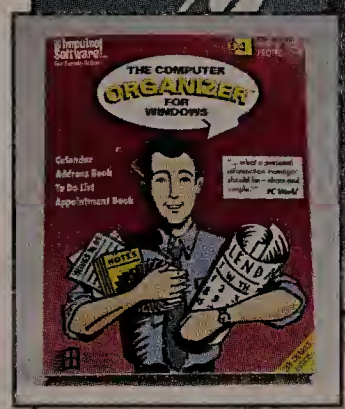

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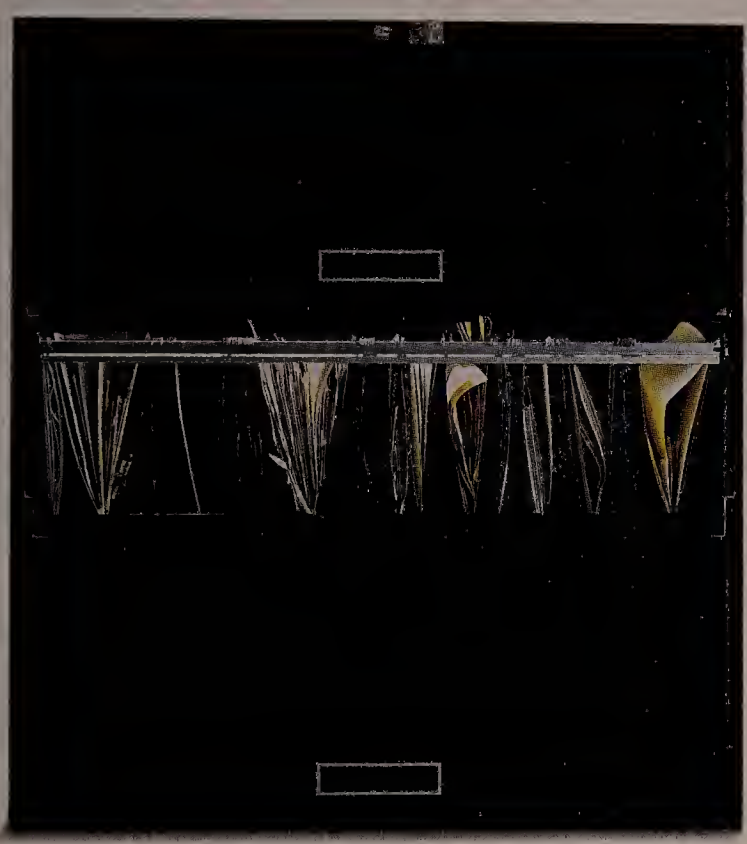
1790 ~ Wooden Track-Drawer Cabinet



1970 ~ Aluminum Alloy Retractable Door Cabinet

INTRODUCING THE BIGGEST ADVANCEMENT IN THE HISTORY OF FILING SYSTEMS.

1993 ~ The New ScanPartner Plus By Fujitsu

In the last 1,500 years or so, document filing systems haven't changed much. Until the new ScanPartner™ Plus by Fujitsu. It gives you the ability to file more documents than all the file cabinets shown here combined.

The ScanPartner Plus is a complete entry-level document imaging solution consisting of a Fujitsu scanner and software package from such leading vendors as Compulink, Xerox Imaging Systems and Blueridge. Just add your PC, Sun workstation, Macintosh, and controller board and you're up and running.

It gives you the power to convert mountains of paper documents into electronic files you can locate instantly. It also lets you get more out of your office space by making those rows of dusty file cabinets a thing of the past. And as your needs change, Fujitsu's complete line of scanners will grow with you, far into the future.

For more information on the ScanPartner Plus, call Fujitsu at **1-800-831-4094**. Or for faxed information, dial 1-408-428-0456 from your fax machine and request document number 1224.

And since ScanPartner Plus gets you started fast at an affordable price, now is a great time to make your file cabinets history.

The ScanPartner Plus gives you the ability to electronically file documents, eliminating the need for those bulky rows of file cabinets. It's like getting free office space with each scanner you buy.

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Circle 153 on reader service card

Here's How

Contents: Spreadsheets 324 | Word Processing 334 | Windows 347 |

HELP LINE Q & A

Tip of the Month

USING THE VSAFE MANAGER: To receive messages from DOS 6.0's VSafe memory-resident virus detector when using Windows, you must load VSafe before entering Windows and load the VSafe Manager after Windows starts.

To load VSafe automatically before you start Windows, put the command VSAFE on its own line in your AUTOEXEC.BAT (so it runs when you start your machine) or in another batch file you use to run Windows. In either case, put VSAFE before the line that includes the WIN command.

To load VSafe Manager automatically when you start Windows, first make a back-up of your WIN.INI file as a precaution. Then in File Manager or Program Manager, select File • Run, type WIN.INI, and press <Enter> to open the file in Notepad. At the end of the LOAD= line type a space and MWAVTSR.EXE. Save the file and exit Notepad. Instead of editing WIN.INI, you can drag MWAVTSR.EXE from the DOS directory in File Manager to the StartUp Group in Program Manager. If you use this method and want to avoid minimizing VSafe Manager every time Windows starts, select the program's icon, open it with <Alt>-<Enter>, and click Run Minimized.

Shane Rau, Assistant Technical Editor

Skip Compression for Tape Compatibility

Q Our office recently purchased a Colorado Memory Systems Jumbo Trakker 120 parallel-interface tape drive to back up a number of separate PCs. It works fine except when I try to restore data from a tape written by the Trakker to a system equipped with a Mountain Network Solutions drive. For some reason, the Mountain unit can't read the Trakker tape. According to the accompanying manuals, both drives and their software support the QIC tape format standards. What's the problem?

Cheri Helgrel, Danville, Illinois

A Your query doesn't provide enough information to offer a definitive response, but I'm 95 percent certain that your problem is compression. The prevalent PC tape drive standards today are QIC-40 and QIC-80, which as originally drafted let you store 40MB and 80MB, respectively, on a standard-length cartridge such as 3M's DC2000. Extended-length cartridges, like the DC2120, add 50 percent more capacity, increasing QIC-40 to 60MB and QIC-80 to 120MB. In theory, any QIC-40 drive should be able to read and write any tape formatted and written using any other QIC-40 drive, regardless of manufacturer or length. The same goes for QIC-80 drives, which can also read (but not write) QIC-40 tapes.

Manufacturers also build optional compression into the tape-backup software. Depending on the type of data being backed up, files can shrink to half, or even less, of their original size, effectively doubling a QIC-40 drive's capacity to 120MB and a QIC-80's to 240MB. With compression, however, comes the rub: Compression algorithms are proprietary, and one manufacturer's backup software is generally unable to read data compressed and backed up by another's software. The files are still arranged on the tape in accordance with the QIC format, but the contents of those compressed files are unreadable. You ean continue using the software that came with your drive and maintain compatibility with other manufacturers' drives by forgoing compression.

Readers having compatibility problems with QIC drives that don't use a parallel interface can get compatibility and compression by standardizing back-up software. Ask your dealer if the DOS or Windows version of Norton Backup (included in Norton Desktop) or Central Point Backup (included in PC Tools) supports your drives.

- **Norton Backup 2.2 for DOS, Norton Backup 2.2 for Windows** $149 each; Symantec Corp.; 800/441-7234, 408/252-3570
  Reader service no. 642
- **Central Point Backup for DOS 8.0, Central Point Backup for Windows 2.0** $129.95 each; Central Point Software; 800/964-6896, 503/690-8088
  Reader service no. 643

Move CD ROMs Into the Fast Lane

Q I just added a CD ROM drive to my system and discovered to my surprise that Microsoft's SmartDrive does not cache CD ROM drives. If anything needs a read cache, a CD ROM does. Could I be wrong? Please advise.

Phuong Char, Homosassa, Florida

A You are correct. As we went to press, the latest version of SmartDrive, 4.2, didn't cache CD ROM drives. Howev-

er, a Microsoft source informs me that by the time you read this, a CD ROM–caching SmartDrive 5.0 should be available for downloading.

In the meantime, consider beefing up performance with a cache that does handle CD ROMs, such as Lucid Corporation's Lightning for Windows, Symantec's Norton SpeedCache Plus 4.0, or PC-Kwik's Super PC-Kwik 5.1 (included in the company's Super PC-Kwik Power Pak 3.1 utility bundle). Bloc Publishing's CD Speedway is a CD ROM–only cache program.

- **CD Speedway** $99.95; Bloc Publishing; 800/955-1888
  Reader service no. 638
- **Lightning for Windows 1.2** $89.95; Lucid Corp.; 800/967-5550, 214/994-8100
  Reader service no. 639
- **Norton SpeedCache Plus 4.0** $99; Symantec Corp.; 800/441-7234, 408/252-3570
  Reader service no. 640
- **Super PC-Kwik 5.1** $79.95; PC-Kwik; 800/274-5945, 503/644-5644
  Reader service no. 641

In Terrible Need of Terabytes

Q I am in the process of starting up a multimedia-oriented business. By March 1995, we'll be storing as much as 150 hours of top-quality video, and will need the fastest accessibility possible. In addition, we will need to store roughly 16,000 still photo images. All of these images will require substantial editing. For that reason, we'll likely store it all on CD ROM or hard disk, rather than on videotape or another sequential-access medium. Is the current desktop technology able to handle my needs?
John Michael Palmer,
Littleton, Colorado

A The answer is yes—maybe. CD ROM, in its newest write-once format (CD-R, also known as CD Write Once), is a good choice for many of the storage needs you've described and will become even more irresistible in a year or two. Today, you can purchase a desktop CD-R system, including software for writing files to blank CDs, for less than $5000. Disks cost as little as $20 each; and like mass-produced CDs, they hold more than 650MB and last for decades. By 1995, CD recorders may cost as little as $2000, with blank disks as cheap as a few dollars each, if bought in quantity. Using a CD-R system, you can archive raw data for pennies per megabyte and read it back on any computer equipped with an inexpensive CD ROM drive. If the current cost of a CD recorder is too high for you to justify, a growing number of service bureaus will create a single CD ROM of your data for as little as $100. For more information on CD-R, see "Permanent Press" in the August 1993 issue of the *Multimedia World* insert to *PC World*.

CD-R is perfect for digital photography. Kodak's Photo-CD technology is based on CD-R, and while any manufacturer's CD recorder will do the job, Kodak (800/242-2424) reportedly will soon release a Photo-CD recorder system for professional photographers.

Magneto-optical (MO) technology is another excellent high-capacity alternative to hard disks. Although blank MO cartridges are several times more expensive than blank CD-R disks, they currently hold up to 1.2GB per cartridge, with significantly faster access than with CD ROM. Best of all, MO is rewritable, making it the perfect storage device for images that need editing. For a review of smaller-capacity, low-cost MO drives, see "MO Drives: Storage for the Masses" in the September issue.

Video is another story, however. You can capture and replay VCR-quality digital video today, but be prepared to pay through the nose. Video-capture boards for less than $1000 have limits—you can enjoy a fast frame rate and high-resolution full-color images, but not all at once. A $5000 purchase will net you a pair of capture and playback adapters from Optibase (800/451-5101) capable of capturing and reproducing video roughly equivalent in quality to Super VHS tape (30 352-by-240-pixel,

USER GROUP OF THE MONTH

Winnipeg PC User Group

December's user group tips come from the Winnipeg PC User Group. WPCUG's 32-page monthly newsletter is filled with news, reviews, tips, and tricks, and the six-line BBS has more than 300 conferences and over 3 gigabytes of shareware and public domain files. The Winnipeg PC User Group also offers special interest groups for people using Windows, WordPerfect, Quicken, FoxPro, and Clipper, as well as for beginners and programmers.

For more information, contact Hart Macklin at P.O. Box 3149, Winnipeg, Manitoba, Canada, R3C 4E6, or you can call the group's 24-hour information hot line at 204/488-9796. The public electronic bulletin board number is 204/338-0272. Meetings are held on the third Thursday of every month and membership costs $45 per year.

Reader service no. 603

TIME FOR A NEW VERSION: Ever wonder what version of MS-DOS or Windows a given file originally came from? It's easy to find out if you know where to look, because Microsoft timestamps its program files with the version number. The files that came with Windows 3.0 all appear to have been created at '3:00', those that come with Windows 3.1 are stamped '3:10', and Windows for Workgroups' files show '3:11'. The files that come with DOS 5.0 show '5:00' while DOS 6.0 files show '6:00'. Some other companies follow a similar procedure. For instance, Central Point's PC Tools for Windows Desktop 1.0 files show '1:00', and its DOS version, PC Tools Desktop, uses '8:00'.

Hart Macklin
Winnipeg PC User Group

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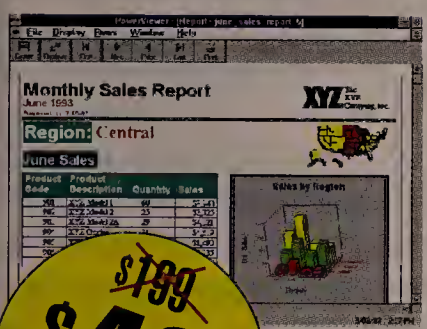
PowerViewer



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```
A     A        B      C                                                  D        E        F        G        H
1   List     \R       {goto}A:A2~
2   Allen             /rncLIST~{bs}.{end}{d}~
3   Barb              {if LISTSIZE<3}{quit}
4   Charlie           {for STEP,1,LISTSIZE,1,SWAP}
5   Debbie            {calc}{quit}
6   Earl
7   Francis  SWAP     {let HOLD,@index(LIST,0,LISTSIZE-STEP)}
8   George            {calc}
9   Helen             {put LIST,0,LISTSIZE-STEP,@index(LIST,0,RANDPICK)}
10  Irving            {put LIST,0,RANDPICK,HOLD}
11  Jill              {return}
12
13          STEP
14          HOLD
15          RANDPICK @INT(@RAND*(LISTSIZE-STEP+1))
16          LISTSIZE @COUNT(LIST)
```

FIGURE 1: YOU CAN SHUFFLE ANY LIST effortlessly by using this 1-2-3 release 3 macro.

24-bit frames per second) using the MPEG I codec (a compression/decompression algorithm named after the Motion Picture Experts Group that finally approved it last fall). The catch: The board doesn't work in real time—it requires 100 seconds to capture and compress 1 second of video. Optibase said it would introduce a $20,000 real-time capture board by September.

MPEG I was designed to be played back from CD ROMs, which can hold 72 minutes of MPEG-encoded footage. A new generation of drives due in a year or so will double the capacity of current CD ROMs by using shorter-wavelength, blue-laser technology. Quadruple-speed drives currently under development will double data throughput. According to Optibase, however, broadcast-quality digital video (30 728-by-480-pixel, 24-bit frames per second) in the form of a yet-to-be-approved MPEG II spec may never reach the desktop due to its vastly higher bandwidth requirements.

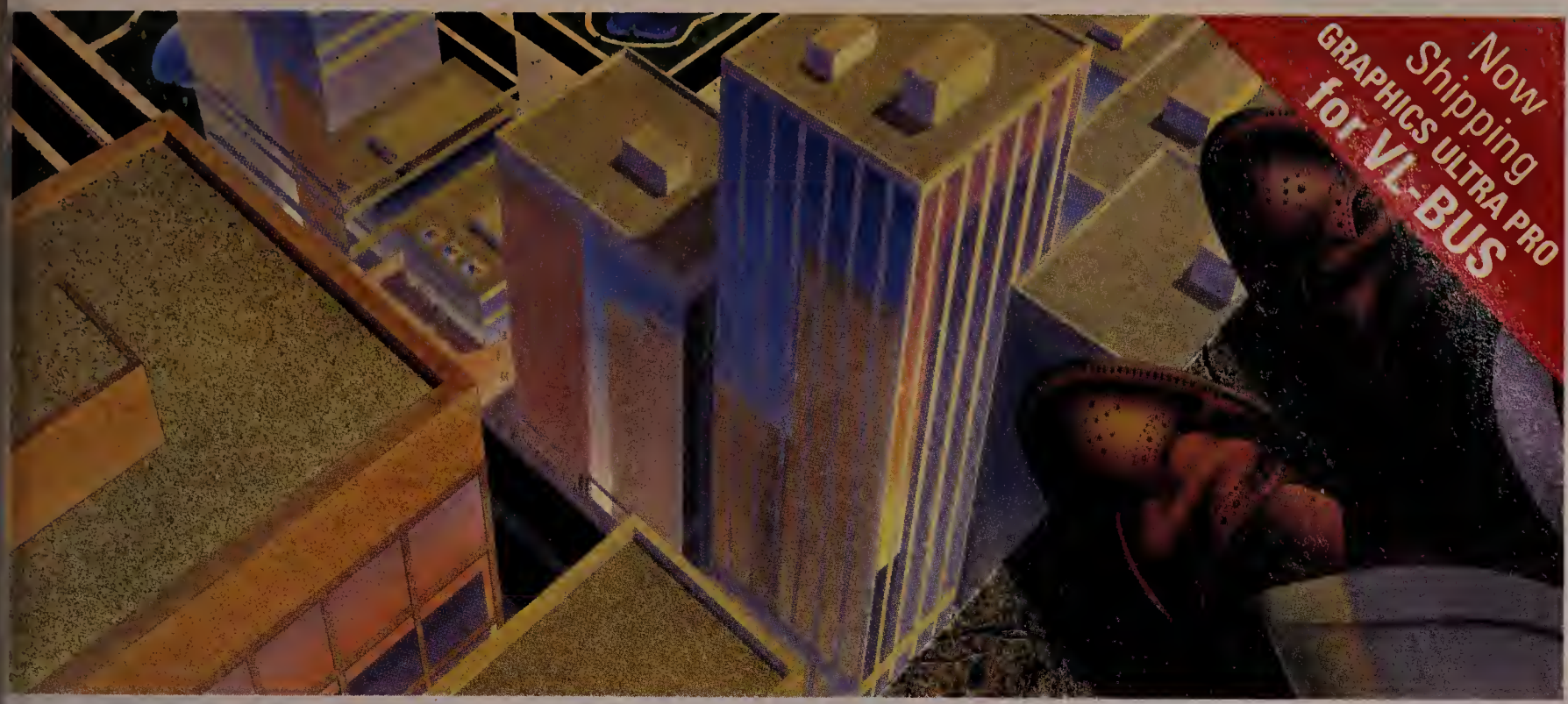
Spreadsheet Shuffle

Q The misprinted 1-2-3/Quattro Pro formula for generating a random integer between two values, in last June's "50 Spreadsheet Tips" wasn't hard to correct, especially with the correct Excel version following it. However, I wish you could come up with a way to randomize a list so that each member shows up once and only once. It sure would help those of us who place entrants in sporting events, mix up Little League positions, or perform other common chores that require shuffling.
George East, Hemet, California

A The 1-2-3 release 3 macro in **FIGURE 1** will shuffle any number of items that you can list in one column, provided there are no blanks in the list. To enter the macro, first type in the heading (**List**) and the sample data (or your own data) in column A. Next, type in the labels in column B, preceding the backslash in B1 with an apostrophe. After entering the last label, select */Range Name Labels Right*, use the **<Up>** cursor key to highlight all the labels in column B, and press **<Enter>**. Then carefully type in the macro commands and formulas in column C; remember to precede the line that begins with a slash (C2) with an apostrophe. The formulas in C15 and C16, of course, won't appear in their cells, and you can ignore the ERR values they produce—those ERRs will disappear when the range LIST is defined. Finally, save the file. You can now press **<Alt>-R** to run the macro, shuffling the list as often as you like.

The macro works by first moving the cell pointer to cell A:A2 (the first member of the list). This line contains the only specific cell reference (all other cell references are made through range names); if you use this macro to shuffle a list that begins in another cell, change this line accordingly. The next line creates the range name LIST (defining it to include all the items in the list). Line 3 stops the macro if there are just one or two members in the list. The {for} command in C4 sets STEP (C13) with the value of {for}'s second parameter (1) and calls the subroutine SWAP, which is specified by {for}'s last parameter. With each return from SWAP, {for} increases the value of STEP by 1 ({for}'s fourth parameter) and again calls the SWAP subroutine until increasing STEP makes it larger than LISTSIZE ({for}'s third parameter). In other words, {for} calls the subroutine SWAP as many times as there are members in LIST and increases STEP in increments of 1.

The SWAP subroutine begins in C7 with a {let} command that puts in HOLD (C14) a copy of one of the members in the list. The member is chosen by an @INDEX() function. The first time SWAP is called, @INDEX() finds the last member of LIST: @INDEX()'s first parameter is the source range, the second one is the column offset (0 means the range's first column, 1 would mean the second column, and so on), and the third is the row offset. Since LISTSIZE equals 10 and STEP equals 1 the first time SWAP is executed, LISTSIZE-STEP yields an offset of 9, which means the 10th row, or last member. Next, a {calc} is issued so the formula in RANDPICK (C15) will generate a random number between 0 and one less than the number of members in the list. That random number is used as a row offset in the next two lines, which simply put a copy of the randomly picked member in the last position in the list and then copy the last member (from HOLD) to the position the randomly picked member originally occupied. Execution then returns to the {for} command. Because {for} increases STEP, LISTSIZE-STEP causes SWAP to act as if the list has one less member. Thus @INDEX() will put the next member up the list in HOLD and C15's formula will pick a



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Circle 5 on reader service card

```
@ECHO OFF
IF "%1"==""  GOTO HEY
IF %1==a: GOTO FORMAT
IF %1==A: GOTO FORMAT
IF %1==b: GOTO FORMAT
IF %1==B: GOTO FORMAT
GOTO YOW

:FORMAT
ECHO. >C:\KEYS.TXT
ECHO. >>C:\KEYS.TXT
ECHO N >>C:\KEYS.TXT
FORMAT %1 /Q/U<C:\KEYS.TXT
DEL C:\KEYS.TXT
GOTO END

:HEY
ECHO.
ECHO Hey! You also have to specify the
ECHO floppy drive, as in FASTFORM A:
ECHO.
GOTO END

:YOW
ECHO.
ECHO Yow!!!
ECHO You almost formatted the hard disk!
ECHO.

:END
```

FIGURE 2: FASTFORM.BAT FORMATS A FLOPPY without displaying DOS's usual barrage of prompts.

random number between 0 and one less than the last number it used.

Thus the list is shuffled from the bottom up—the last member swaps places with a random member above it, the member in the next-to-last position swaps with a random member above it, and so on. When this is done, execution steps to the cell after the {for} command, C5—{calc} turns off the CALC indicator and {quit} ends the macro.

Streamlined Floppy Format

Q Is there a way to automate DOS's FORMAT command so I don't have to respond with keystrokes to the 'Insert new diskette for drive B: and press ENTER when ready', 'Volume label (11 characters, ENTER for none)', and 'Format another (Y/N)?' prompts? I'd like to format several floppy disks in succession with the minimum number of keystrokes.

Kerry Shea via PC World Online

A You can use ECHO. and the DOS pipe (|) to send <Enter> to the first prompt and use the /V:NONE parameter to suppress the volume label prompt (as in ECHO. | FORMAT /Q/U/V:NONE), but automating the answering of the final prompt must be done by redirecting a character from a file to the prompt. Since we're using a file to answer one prompt, we might as well use that same file to answer all three. FASTFORM.BAT (**FIGURE 2**) uses this technique for no-questions-asked formatting. Use an ASCII text editor to create the batch file, then save FASTFORM.BAT as ASCII text in a directory listed in your system's PATH statement. Whenever you need to format a floppy, insert a disk and issue the command FASTFORM *d*:, where *d* is the floppy's drive letter.

FASTFORM.BAT checks to see if you typed a floppy drive letter, generating an error message if you didn't. If all's well, the batch file uses ECHO to create the file of responses for FORMAT's prompts. ECHO with a period immediately following it generates an <Enter>, and the single greater-than (>) symbol sends that <Enter> into the file named after it (C:\KEYS.TXT), creating the file if it doesn't exist or replacing its contents if it does exist. The double greater-than (>>) symbol in the next two lines appends the output of the command on its left to the file on its right, thus completing C:\ KEYS.TXT with a second <Enter> and an *N*. The next line issues the FORMAT command, replacing the %1 with the drive letter you typed after the FASTFORM command, and feeds the keys in C:\KEYS.TXT to FORMAT's prompts. The /Q tells FORMAT to do a quick format, assuming the disk has been formatted before and has no defects; if this is not true, omit the /Q. The /U tells FORMAT to do an unconditional format; FORMAT will not save unformatting information. The batch file deletes C:\KEYS.TXT and ends. MLTIFORM.BAT (**FIGURE 3**) adds a looping structure and reinstates one of FORMAT's prompts so you can format floppies endlessly with no fuss.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Help Line *welcomes your questions. See page 10 for contact information.*

```
@ECHO OFF
IF "%1"==""  GOTO HEY
IF %1==a: GOTO FORMAT
IF %1==A: GOTO FORMAT
IF %1==b: GOTO FORMAT
IF %1==B: GOTO FORMAT
GOTO YOW

:FORMAT
ECHO. > C:\KEYS.TXT
ECHO. >> C:\KEYS.TXT
ECHO N >> C:\KEYS.TXT
ECHO Place disk in drive %1
ECHO or press Ctrl-Break to exit.
PAUSE
FORMAT %1 /Q/U<C:\KEYS.TXT>NUL
DEL C:\KEYS.TXT
GOTO FORMAT

:HEY
ECHO.
ECHO Hey! You also have to specify the
ECHO floppy drive, as in MLTIFORM A:
ECHO.
GOTO END

:YOW
ECHO.
ECHO Yow!!!
ECHO You almost formatted the hard disk!
ECHO.

:END
```

FIGURE 3: MLTIFORM.BAT FORMATS DISKS repeatedly by adding a loop to the technique in Figure 2.

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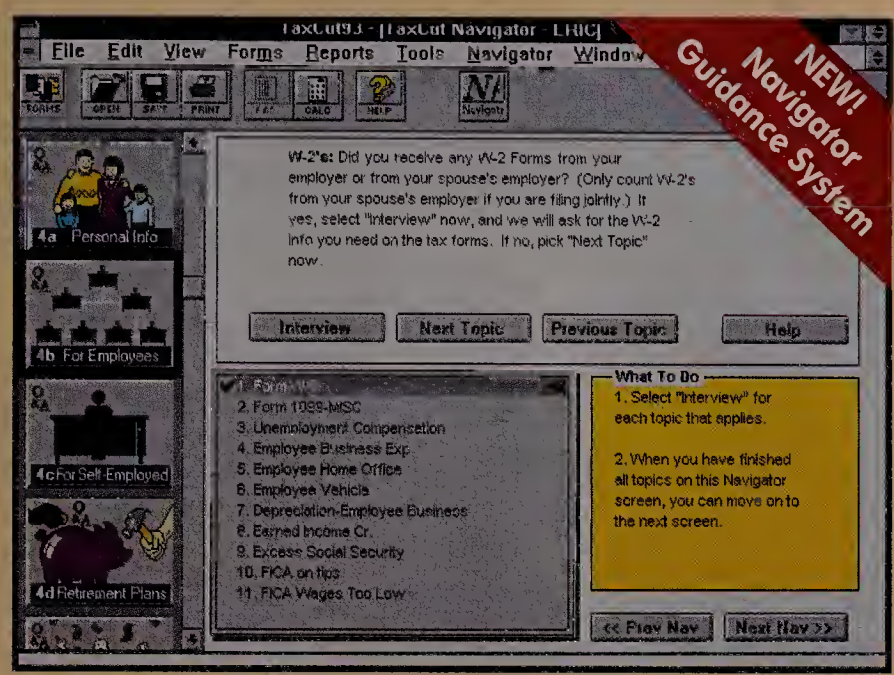

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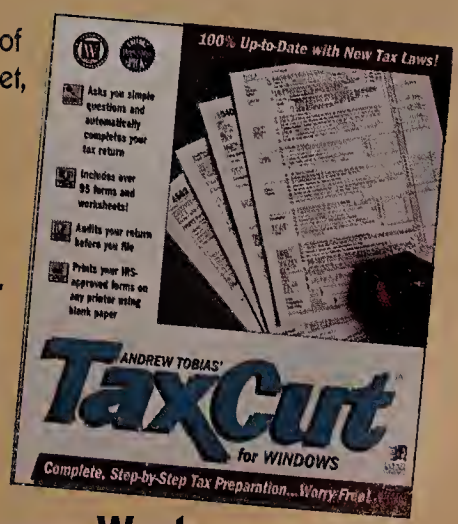

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Circle 228 on reader service card

SPREADSHEETS Q & A

Enter Data Quickly in Excel

Q I have a large Excel 4.0 template with data cells scattered throughout. Instead of selecting each cell separately with the mouse, I want a quick way to skip from cell to cell and enter data.
Lori L. Jarrett, Speedway, Indiana

A You can use a range name to select the data entry cells, and the <Enter> key to move quickly through the selection as you enter values. This technique also works in Quattro Pro 5.0 for Windows. To set it up, select the second data cell, hold down **<Ctrl>**, and click with the mouse to select the discontiguous cells and ranges in which you want to enter values. Be sure to select them in the same order in which you want to enter data. End by **<Ctrl>**-clicking on the first data cell.

Now select *Formula•Define Name* (in Quattro, select *Block•Names•Create*, enter a name, and click *OK*. When you are ready to enter data, press **<F5>** and double-click the name. Excel selects all the data cells with the first cell active. Whenever you type a value and then press **<Enter>**, Excel will move to the next cell in the selection.

1-2-3 in the Round

Q I use 1-2-3 release 2 for setting up balance sheets. When I have several numbers that total to zero, the answer often isn't really zero, but some very tiny negative number. When I format the cell to display two decimals, it shows up as a negative zero ($0.00), which makes the spreadsheet look messy and really doesn't make any sense. Can you help me?
Randy Daming, St. Louis

	A	B	C
1	Assets	$10.00	$10.00
2	Liabilities	$1.60	$1.60
3		$2.70	$2.70
4		$5.70	$5.70
5	Balance	($0.00)	$0.00

FIGURE 1: AVOID DISPLAYING NEGATIVE ZEROS with an @ROUND() function in your 1-2-3 formulas.

A When a computer works with numbers, it must translate them from the decimal system people understand to its own binary system, and then back again. This results in minute inaccuracies that are generally too small to worry about. Because the unrounded value in this example is a very small negative number, 1-2-3 displays its rounded value as a negative zero, a number that is—quite literally—impossible.

What do you do about it? Use the @ROUND() function to standardize the values. **FIGURE 1** illustrates the solution. Cells B1..C4 contain the values shown, and cell B5 contains the formula +B1-@SUM(B2..B4). I used the command /Worksheet•Global•Format•Currency to display two decimals, and the result I get is a negative zero.

In contrast, the formula in C5 is @ROUND(C1-@SUM(C2..C4),2). Like the original formula, this one takes the Assets value from C1, and subtracts the sum of the expenses in C2..C4. Only this time, it then rounds the result to two decimals. Notice that the

	A	B	C	D	E	F	G	H
1		Year				LIST	A8..B22	
2	Event	1994	1995	1996		TABLE	A2..D5	
3	A	4	2	1		\C	D13	
4	B	2	0	3		\C_1	D20	
5	C	1	1	1		\C_2	D22	
6						\C_3	D26	
7	Event	Year				\C_CTC	D9	
8	A	1994	\C_CTR	0		\C_CTL	D11	
9	A	1994	\C_CTC	0		\C_CTN	D10	
10	A	1994	\C_CTN	0		\C_CTR	D8	
11	A	1994	\C_CTL	-1				
12	A	1995						
13	A	1995	\C	{}				
14	A	1996		{blank LIST}				
15	B	1994		/rncTABLE~{esc}.{end}{r}..{end}{d}~				
16	B	1994		/rncLIST~{esc}.{r}{d @sum(TABLE)-1}~				
17	B	1996		{let \C_CTL,(@sum(TABLE)-1)}				
18	B	1996		{for \C_CTR,@rows(TABLE)-1,1,-1,\C_1}~				
19	B	1996						
20	C	1994	\C_1	{for \C_CTC,@cols(TABLE)-1,1,-1,\C_2}				
21	C	1995						
22	C	1996	\C_2	{if @index(TABLE,\C_CTC,\C_CTR)=0}{return}				
23				{let \C_CTN,@index(TABLE,\C_CTC,\C_CTR)}				
24				{for \C_CTN,\C_CTN,1,-1,\C_3}				
25								
26			\C_3	{put LIST,0,\C_CTL,@index(TABLE,0,\C_CTR)}				
27				{put LIST,1,\C_CTL,@index(TABLE,\C_CTC,0)}				
28				{let \C_CTL,\C_CTL-1}				

FIGURE 2: UNSCRAMBLE YOUR 1-2-3 DATA that's currently compressed into a frequency table, using a macro that calculates original data from a crosstab report.

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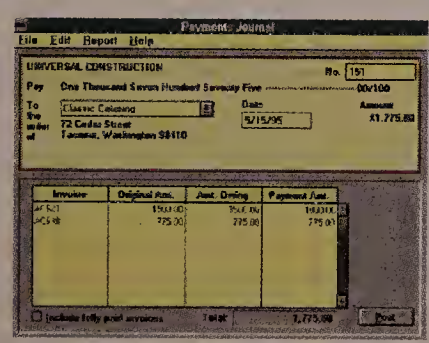

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Circle 42 on reader service card

Master Class: When Data Works Best

This month I want to discuss a common, exasperating problem: the failure to recognize the database that may be lurking in your spreadsheet. If, for example, you're accumulating data over time or keeping records as opposed to modeling, you've probably got a budding database on your hands.

By organizing the data as a database, you can continue to generate standard reports using the crosstabs and extract feature of your worksheet program. But you'll also be able to do a lot more by generating alternative crosstabs and extracting groups of records for list reports. The principles I discuss this month apply particularly to the new Windows spreadsheets such as Excel 4.0 and 5.0, Quattro Pro 5.0, and 1-2-3 4.0, which are equipped with crosstabs reports and similar data modeling tools.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Hospital Quality Assurance Survey											
2			Performance									
3				Jan-93			Apr-93			Jul-93		
4	Indicator	T %	N	D	%	N	D	%	N	D	%	Comments
5	Unit 1											
6	1. Effectiveness of therapy	90%	24	27	89%	71	72	99%	28	29	97%	
7	2. Maintenance	95%	28	31	90%	78	86	91%	79	80	99%	
8	3. Physical problems	100%	33	33	100%	76	79	96%	95	96	99%	
9												
10	Medical Unit											
11	1. Documentation	100%	92	93	99%	3	4	75%	82	87	94%	Review w/ unit
12	2. Patient falls	5%	54	56	96%	42	45	93%	72	73	99%	Follow up scheduled
13	3. COPD patient mgnt.	95%	35	37	95%	23	25	92%	80	84	95%	
14												
15	Long Term Care											
16	1. Diabetic patient mgmt.	95%	73	78	94%	53	54	98%	53	54	98%	
17	2. Maintenance	100%	69	71	97%	30	32	94%	8	9	89%	

FIGURE 1: CREATING THIS CROSSTAB REPORT from a worksheet reorganized as a database will give you much more flexibility than doing it from scratch.

In one of my recent training classes, Charlie, a medical-quality-assurance specialist, showed me an Excel 4.0 report similar to the one in FIGURE 1. "I set up this report to submit to my hospital's Quality Review Board," he said. "For each unit in our hospital, we report several quality indicators. Each indicator has a minimum permissible threshold percentage (T%) of cases that meet standards. Every quarter, the unit records the number of acceptable cases (the numerator, N), the total number of cases in that category (the denominator, D), and the percentage of acceptable cases (%). But my worksheet isn't as flexible as I'd like: Each quarter, I have to add columns to hold the new data. And now I'm trying to prepare a report that shows only the indicators that are below threshold, but it's taking a lot of rework. How can I make this more efficient?"

I pointed out that if he were to reorganize his worksheet into a database, he could use Excel's crosstabs feature to produce his current report easily (see "Master Class: Excel Crosstabs" in the December 1992 *Spreadsheets* for details), while the Data Extract command would let him prepare his list of substandard indicators almost instantaneously.

After a few minutes of discussion, we came up with the reorganized database worksheet shown in FIGURE 2. First, we recognized that the basic unit of data was a numerator and denominator for a single indicator for one quarter, so we knew that the database would comprise one record for each pair of N and D values. We noticed that the first column of his original report held two attributes of a record—the Unit and the Indicator name—so in the database, we separated them into two fields, shown in columns A and B. The quarter goes in column C, and the threshold percentages in column D. The numerator and denominator values go in E and F, while column G contains a set of formulas to calculate the percentage: For instance, the formula in G2 is =E2/F2.

Starting with the reorganized database, we generated Charlie's regular report using Excel's Crosstabs Wizard (the result is shown in Figure 1). We selected *Data • Crosstab*, and specified *Unit* and *Indicator* as the row categories, *Qtr* as the column category, and *T_Percent, N, D,* and *Percent* as the fields to calculate values from. We selected a layout, clicked *Create It*, and let Excel do the work.

Excel includes subtotals and grand totals in the crosstabs report automatically, so we deleted them and formatted the table to resemble Charlie's original report. Then, to create a list of the indicators below threshold, we copied the field headings from the original database to cell I3. To create the extract range, we selected I3:O3 and executed */Data • Set Extract.* Next, we chose a criteria range, I1:I2, and executed */Data • Set Criteria.* In cell I2 we entered the formula =Percent<T_Percent to cull the unacceptable indicators. (The #NAME? prompt shown in cell I2 is correct; it appears because Excel interprets the field names as range names.) Then we used the *Data • Extract* command to produce the list in Figure 2 beginning at cell I4. The database and report worksheets are available, in SPRDDATA.ZIP, on PC World Online.

	A	B	C	D	E	F	G	H	I	J
1	Unit	Indicator	Qtr	T_Percent	N	D	Percent		TooLow	
2	Long Term Care	Diabetic patient mgmt.	Jan-93	95%	73	78	94%		#NAME?	
3	Long Term Care	Maintenance	Jan-93	100%	69	71	97%		Unit	Indicator
4	Medical	COPD Patient mgmt.	Jan-93	95%	35	37	95%		Long Term Care	Diabetic patient mgm
5	Medical	Documentation	Jan-93	100%	92	93	99%		Long Term Care	Maintenance
6	Medical	Patient falls	Jan-93	5%	2	54	4%		Medical	COPD Patient mgmt.
7	Unit 1	Effectiveness of therapy	Jan-93	90%	24	27	89%		Medical	Documentation
8	Unit 1	Maintenance	Jan-93	95%	28	31	90%		Medical	Patient falls
9	Unit 1	Physical problems	Jan-93	100%	33	33	100%		Unit 1	Effectiveness of the
10	Long Term Care	Diabetic patient mgmt.	Apr-93	95%	53	54	98%		Unit 1	Maintenance
11	Long Term Care	Maintenance	Apr-93	100%	30	32	94%		Long Term Care	Maintenance
12	Medical	COPD Patient mgmt.	Apr-93	95%	23	25	92%		Medical	COPD Patient mgmt.
13	Medical	Documentation	Apr-93	100%	3	4	75%		Medical	Documentation
14	Medical	Patient falls	Apr-93	5%	3	42	7%		Unit 1	Maintenance
15	Unit 1	Effectiveness of therapy	Apr-93	90%	71	72	99%		Unit 1	Physical problems
16	Unit 1	Maintenance	Apr-93	95%	78	86	91%		Long Term Care	Maintenance

FIGURE 2: A DATABASE LIKE THIS ONE allows you to create crosstab and other types of reports easily, and with a great deal of variety.

continued on page 331

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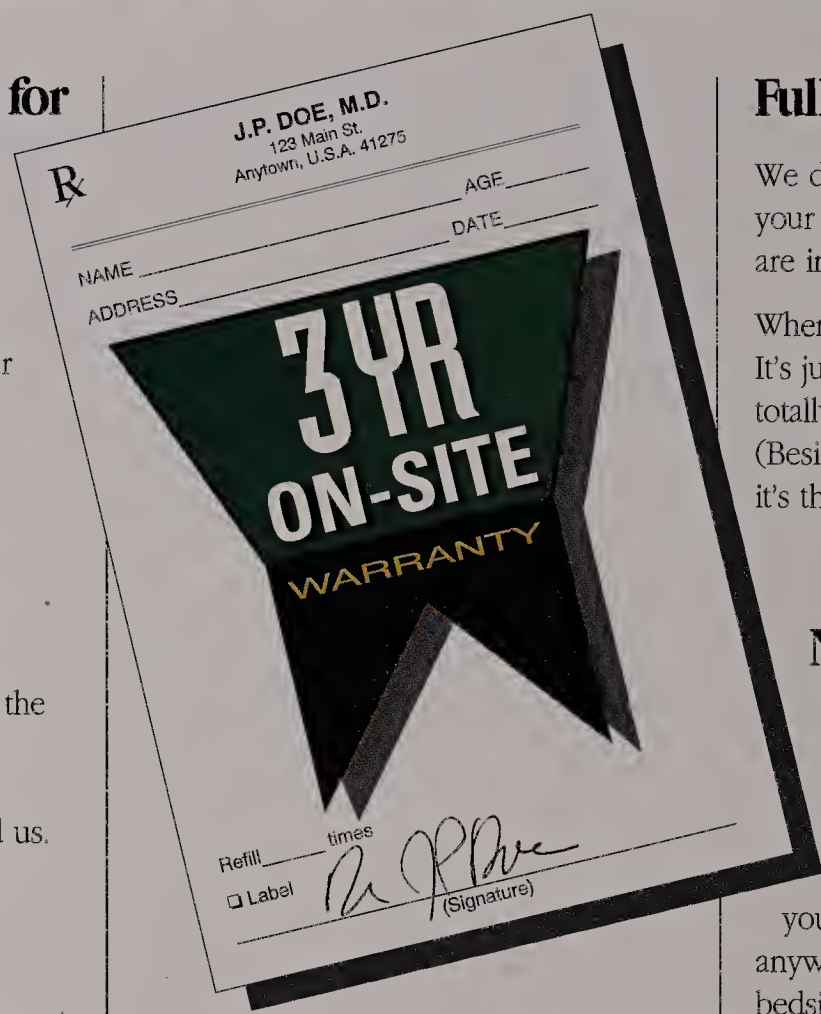

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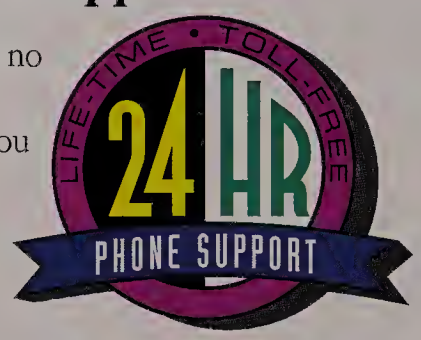

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Spreadsheet Toolbox

Data compression is an indispensable tool in the eternal struggle to tame bulging hard disks. Now 1-2-3 users can shrink their files to minuscule proportions with CompressMate, a $79 add-in from Intex Solutions. This utility capitalizes on the inherent redundancy of formulas and blank spaces in spreadsheet files to yield compression ratios of up to 60 to 1. It's compatible with other popular compression schemes to let you shrink your files even further.

Whenever you save a WK1 file, the CompressMate utility intervenes and saves the file in a special compressed format. You can retrieve these files normally or decompress them with a command-line utility. You can also decompress your files when you deactivate CompressMate.

The disk savings I achieved varied widely with what was in my worksheet. A file containing 4000 data values and 1000 SUM formulas shrank by 10 to 1. An amortization schedule that had hundreds of similar formulas was compressed 64 to 1. But a macro-driven application containing database tables, lots of macro code, and very few formulas hardly compressed at all. That's because macros and data, unlike formulas, generally aren't redundant.

CompressMate $79; Intex Solutions; 617/449-6222, 617/444-2318 (fax)

Reader service no. 605

@ROUND() function does more than just change the format: It also makes the rounded numeric value more precise, which will improve the accuracy of your calculations with currency values. My sample worksheet is available, as ROUNDBAL.WK1, on PC World Online.

Uncrossing 1-2-3 Data

Q I have a 1-2-3 worksheet with a summary table showing how often certain events occur each year (say Event A occurs four times in 1994). I want to turn it into a database-style listing that devotes a line to each event every time it occurs in a given year. The sheet must accommodate a summary table that changes in size. How can I accomplish such a trick?

Richard Kaskel, Greenwich, Connecticut

A I get it, you want to "uncross" a frequency table to recover the original database—a noble thought (see "Master Class: When Data Works Best" for a discussion of additional benefits).

How about the macro in **FIGURE 2**? It starts with the frequency table shown in A1..D5 and ends with the database arrangement shown in A7..D22. The macro is located in C8..D28, and F1..G10 contains a table of the macro's range names. To set up the example, enter the text and values shown in A1..D5 (or your own appropriate text and values) and the column headings in A7..B7. Enter all the macro labels shown in C8..C26, and enter the code in D13..D28. Remember that when a label starts with a slash (/ or \), you need to enter an apostrophe first; for instance, to enter the label in cell C8, type **'\C_CTR**. Then use the command */Range•Name•Create* to create each of the range names shown in the table. (The sample macro, ANTICROS.WK1, is available on PC World Online.) When you're ready to execute the macro, just press **<Alt>-C**.

POWERTIP no. 296

Pulling a Key for Better Notebook Typing

Some notebook keyboards are packed into such a tight space, you find yourself hitting <Up> when you try to press the tiny right <Shift> key. You might try gently prying off the <Up> key's cap (put it in a place where you won't lose it). With the cap gone, you're less likely to strike <Up> accidentally. If you do hit it, you'll feel the difference and be able to make a correction. This works because the <Up> key still functions normally without its cap.

Rex Farrance
Associate Editor

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Here's how it works: The macro begins by erasing the old database table (named LIST) in A8..B22, creates a range name to identify the current summary table (TABLE) in A2..D5, and resizes LIST to match. Then, using a series of embedded FOR loops, it steps through TABLE and puts each cell value (which it finds with the @INDEX function) into the next row of LIST, using the {PUT} macro command. Please note that this worksheet is shown squashed onto a single screen; for improved functionality, you should separate the table, list, and macros into distinct work areas (see the *Spreadsheets A..Z* column in June 1991 for more information). The macro details are presented below:

D13 {} is a dummy macro statement that performs no action. It merely allows you to insert new macro statements at the beginning of the macro (by inserting a new row just beneath it) without having to reposition the range name \C.

D14 {blank LIST} clears the old database list so that you can start anew.

D15 /rncTABLE~{esc}.{end}{r}..{end}{d}~ expands or contracts the range name TABLE to accommodate the new table.

D16 /rncLIST~{esc}.{r}{d @sum(TABLE)-1}~ expands or contracts the range name LIST so that it matches the data going into it. The command {d @sum(TABLE)-1} extends the range downward to match the sum of the frequencies in TABLE.

D17 {let \C_CTL,(@sum(TABLE)-1)} helps fill LIST from bottom to top. The variable cell \C_CTL tracks the row of LIST into which the macro will place the next record. This statement initializes it to the total number of items in TABLE; the one in D28 decrements it to zero.

The next series of statements step through each cell of TABLE, then add *n* rows of data to LIST, where *n* is the frequency found in that cell.

D18 {for \C_CTR,@rows(TABLE)-1,1,-1,\C_1}~ executes the subroutine \C_1 (cell D20) once for each row in TABLE (less one for the headings in the first row of TABLE). The variable \C_CTR tracks the current row in TABLE.

D20 {for \C_CTC,@cols(TABLE)-1,1,-1,\C_2} executes the subroutine \C_2 (cell D22) once for each column in TABLE, less the headings in the left column. \C_CTC tracks the current column in TABLE.

D22 {if @index(TABLE,\C_CTC,\C_CTR)=0}{return} bypasses the current subroutine if the frequency in the current cell of the table is zero.

D23 {let \C_CTN,@index(TABLE,\C_CTC,\C_CTR)} records the frequency value from the current cell in TABLE—@index(TABLE, \C_CTC,\C_CTR)—in the variable cell \C_CTN.

D24 {for \C_CTN,\C_CTN,1,-1,\C_3} executes the subroutine \C_3 (cell D26) as many times as the current value of \C_CTN (that is, the frequency found in the current cell of TABLE).

D26 {put LIST,0,\C_CTL,@index(TABLE,0,\C_CTR)} puts the row heading from the left of the current row of TABLE—@index(TABLE, 0,\C_CTR)—into the first column of the current row of LIST.

D27 {put LIST,1,\C_CTL,@index(TABLE,\C_CTC,0)} puts the column heading from the top of the current column of TABLE—@index (TABLE,\C_CTC,0)—into the second column of the current row of LIST.

D28 {let \C_CTL,\C_CTL-1} resets the current row of LIST. From here, the macro returns to D24 to enter the next set of values.

By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions. See page 10 for contact information.*

POWERTIP no.297

Cleaning Up After Your Apps

Many applications leave temporary files in my C:\TEMP directory, which eventually fills with needless files. To clean out this directory automatically, I've added the line ECHO Y|DEL C:\TEMP*.* to my AUTOEXEC.BAT. The line uses the DOS pipe to pass a Y to the command DEL C:\TEMP*.*, thus eliminating the need for user confirmation when the 'Are You Sure?' prompt appears. You can use this command to clean up any other directory automatically; just replace TEMP with the name of that directory.

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Circle 138 on reader service card

WORD PROCESSING Q & A

Wrong Language in WordPerfect 5.1/DOS

Q A friend used my computer recently while I was on vacation. When I returned, I was no longer able to use the spelling checker and thesaurus in WordPerfect 5.1 for DOS. When I try to perform either function, I get a message saying that either WP{WP}US.LEX or WP{WP}US.THS is not found. When I looked in my directory for these files, I couldn't find them. However, I did find WP{WP}UK.LEX and WP{WP}UK.THS. I assume these are British versions of the same files. What can I do?
Garo Salibian, Montreal, Quebec, Canada

A When you install WordPerfect 5.1, it determines the language version and sets itself up to use the proper dictionaries. Somehow, your settings have gotten scrambled. You can either reinstall the spelling checker and thesaurus from the original disks, or you can make a change from within WordPerfect.

Start the program, then press **<Shift>-<F1>45** to set initial codes for all new documents. Now press **<Shift>-<F8>44** and type **UK** to replace US as the language option. Then press **<F7>** repeatedly until you return to the normal editing screen. From now on, any new document you create in the program will use the British-language files when you use the spelling checker or thesaurus.

Some existing documents, however, may still include initial codes pointing to the U.S. language files. If you encounter an error message when trying to use the spelling checker or thesaurus on an existing file, press **<Shift>-<F8>44**, type **UK**, and press **<F7>** until you return to the editing screen. This will reset the language for that document only.

WordPerfect 6.0 Speed Woes

Q I just upgraded from WordPerfect 5.1 to the new WordPerfect 6.0 for DOS. While I like the new graphical features—the scroll bars, button bars, and ribbon—I'm appalled at how slow the program is. I use a 25-MHz 386 PC with 2MB RAM and an HP LaserJet IIID. How can I speed things up?
Alan Bixby, Tempe, Arizona

A WordPerfect 6.0's graphical user interface and access to scalable fonts are exciting additions, but both exact some serious performance penalties. Fortunately, there are ways to minimize the slowdown.

To speed up screen display while entering text, editing, scrolling, and performing other text-based activities, select *View•Text Mode*. Though not as fast as in 5.1, it will accelerate things dramatically. To format your document, change to *View•Graphics Mode* for a view of your document as it will appear on the page.

While in the Graphics mode, avoid using the scroll bars to move around. Instead, revert to your old WordPerfect 5.1 keyboard commands when you need to make large jumps. For example, press **<Home><Home><Cursor Up>** to jump to the top of the document. For smaller cursor movements, use your mouse to click the desired cursor location.

For the fastest possible printing, select fonts native to your printer. On the HP LaserJet IIID, you can choose from Courier and Line Printer, or one of the printer's scalable internal fonts, such as CG Times or Univers. (Other printers have different internal fonts.) To check your fonts, select *Font•Font*. Notice the Type box at the top of the dialog box; it changes as you move the highlight in the font list. If it reads 'Built-In', you've chosen an internal printer font. If it says 'Graphics Font', printing will be much slower (see **FIGURE 1**).

For maximum performance, you may also have to upgrade your hardware. Additional memory will help a bit, but WordPerfect 6.0 is definitely not a speed demon on anything less than a fast 486-class PC.

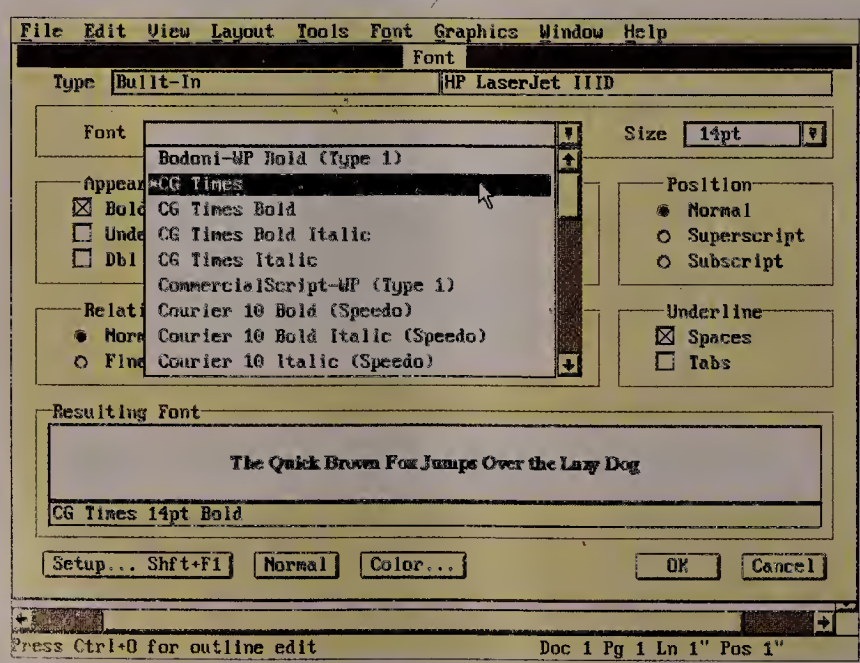


FIGURE 1: TO SPEED PRINTING in WordPerfect 6.0, choose fonts identified as 'Built-In' in the Font dialog box.

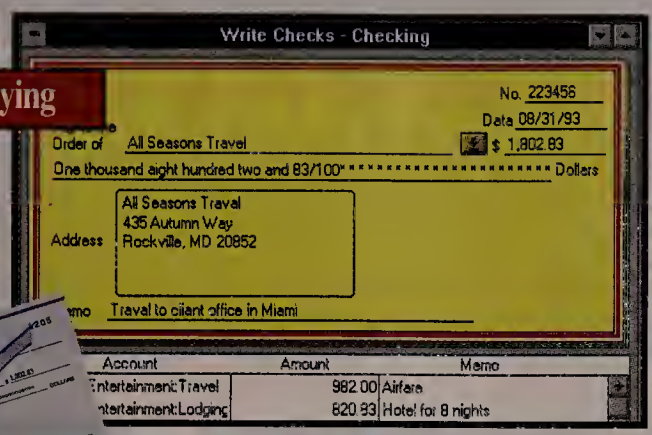
Fancy Page Numbering in WordPerfect 5.2 for Windows

Q I work with long documents in WordPerfect 5.2 for Windows and need better page numbering. My page numbers need to read "Page *x* of *y*," where *y* is the last page of the document. I know you can do this in the DOS versions of the program. Is there a way to do it in the Windows version?
Jack Flynn, Hackettstown, New Jersey

A My answer involves some tricky moves and requires that you put the page numbering in a header or footer. This technique works best on existing documents. If you're working on a new document, create at least part of the text before following the next steps.

With the document loaded, press **<Ctrl>-<End>** to jump to the end of the document. Select *Tools•Mark Text•Cross-Reference*. In the Mark Cross-Reference dialog box, select *Target*. Type **LASTPAGE** in the Target Name box and then click *OK* or press **<Enter>**. This inserts a *[Target<LASTPAGE>]* code at the end of your document. You can see the code in the Reveal Codes window, if you wish, by **continued on page 338**

HEY, QUICKEN USERS! GET THIS.



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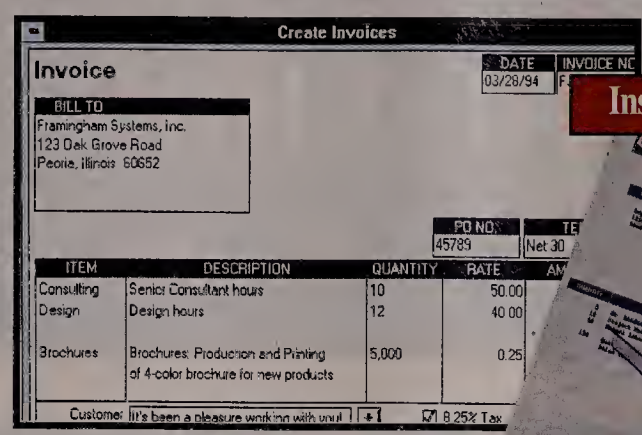

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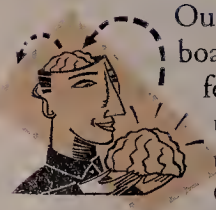

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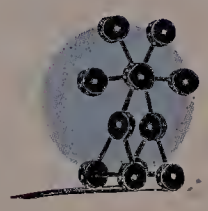

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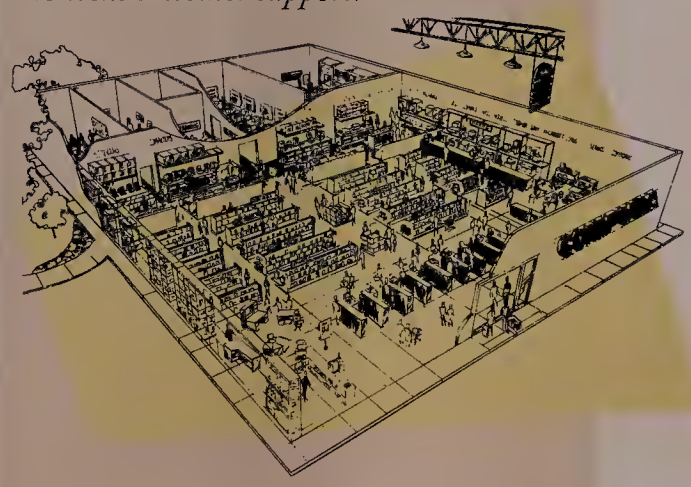

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pressing <Alt>-<F3>.

Press <Ctrl>-<Home> to return to the beginning of the document. Select *Layout•Page*, then *Headers* or *Footers*, depending on whether you want page numbers at the top or bottom of the page. In the *Headers* dialog box, select *Create*. In the editing screen that appears, type **Page**, a <Space>, then select the *Page Number* button. Type another <Space>, then type **of** and a <Space>. Now, from the main menus, select *Tools•Mark Text•Cross-Reference*. Leave the *Tie Reference To* button set to *Page Number*, then type **LASTPAGE** in the *Target Name* box, if it isn't already there. Click *OK* or press <Enter>.

As the final step, format the text in the header however you wish, using normal WordPerfect for Windows formatting commands. You may want to center the page number text by selecting it and pressing <Shift>-<F7>. When you're done, select the *Close* button to return to the normal editing screen.

If those steps seem complicated, well, they are. If you'll use these commands frequently, why not record all the steps above as a macro, using <Ctrl>-<F10> or the *Macro•Record* command?

There's just one more thing to do before printing: Select *Tools•Generate* and answer *Yes* in the confirmation dialog box. This actually creates the header reference itself. If you print the document without doing this, your LASTPAGE reference won't be correct.

Deleting WinWord Custom Dictionary Misspellings

Q I've accidentally added some misspelled words to my custom dictionary in Word for Windows 2.0. When the spelling checker highlighted the word, I got ahead of myself and clicked the Add button. Now the program won't find those misspellings. There doesn't seem to be any command for deleting words from the custom dictionary. Am I stuck with these misspellings forever?

Phillip Yeakle, Bloomington, Indiana

A I've made the same mistake when in a rush, but you're not stuck. WinWord's custom dictionary is just a simple ASCII file called CUSTOM.DIC. All you need do is bring the file up in WinWord, edit it, and save it again.

Depending how you first installed WinWord, CUSTOM.DIC will be in either your WINWORD directory or your WINDOWS\MSAPPS\PROOF directory. To find it, select *File•Find File* and click *Search*. In the dialog box, enter **CUSTOM.DIC** as the File Name, select *C:* in the Drives list box, and click *Start Search*. When the search is over, highlight the file and click *Open* (if the search found more than one CUSTOM.DIC, select the one with the most recent Creation Date). At the Convert File dialog box, double-click on *Text Only*.

You'll now see a list of words, one word per line, in a WinWord editing screen. Locate the offending words, then delete them with normal editing tools. Be sure to remove the entire line for each word. When you're done, select *File•Close*, click *Yes* to save your changes, and close the CUSTOM.DIC document window.

If you have a long list of words you know you need to add to the dictionary, why not just load the CUSTOM.DIC file as described above, then type the words in manually? Just be sure to press <Enter> after typing each word.

Vertical Centering in Ami Pro 3.0 and WinWord 2.0c

Q I need to center the text of a letter vertically in Ami Pro 3.0. I've been pressing <Enter> multiple times to move the text down, but I know that's not the best approach. Does Ami Pro offer a command to do this?

Dennis Adams, San Lorenzo, California

A It took some digging in the depths of Ami Pro's menus, but I found an easy way for you to center your text vertically. Start by moving the cursor to the end of the text that will go on the page you want to center. Now select *Page•Breaks*. You'll see the Breaks dialog box. Make sure the *Insert page break* option is selected, then select the *Vertically center text above page break* check box. When you either click *OK* or press <Enter>, Ami Pro will center the preceding text automatically between the page's top and bottom margins. If you're creating a multiple-page document, you'll have to insert one of these centered page breaks after each page in the document to center all pages.

If the document consists of just one page, Ami Pro will print a blank page following the page in question. To prevent this, select *File•Print*, then set the *Page range* option in the Print dialog box to print From 1 To 1. That way, only your single page will print.

Word for Windows 2.0c users have a similar option. To center text on the page in WinWord, position the cursor anywhere on the page, then select *Format•Section Layout* and the *Center* option in the Vertical Alignment section of the Section Layout dialog box. Click *OK* or press <Enter>; your text will be centered on the page. You can view the change using *Print Preview*. If you want to center text on all pages, move the cursor to the top of the document, then follow the steps above, but select Continuous rather than the default New Page option from the Section Start list.

By George Campbell

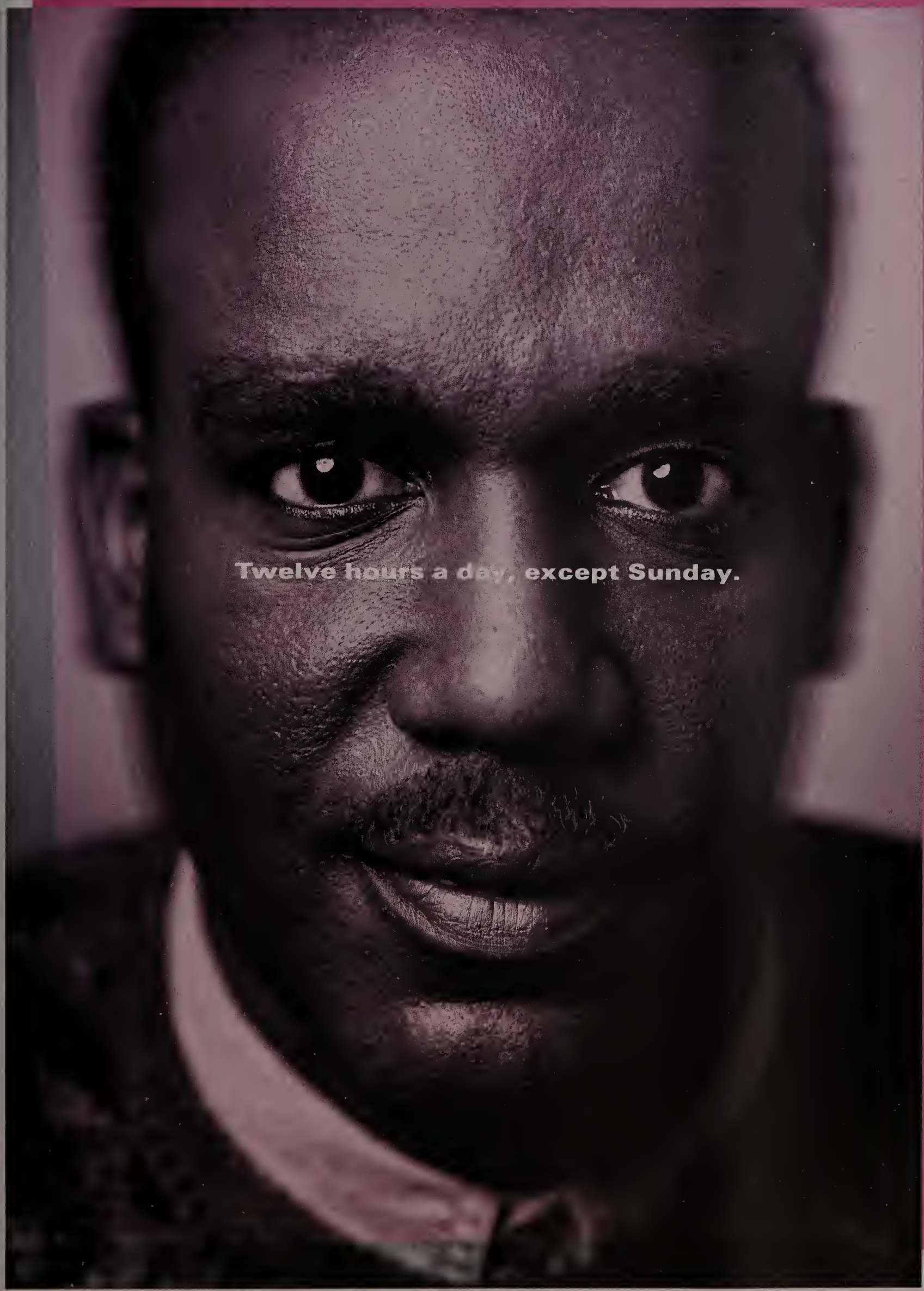
George Campbell is a contributing editor for PC World. Word Processing *welcomes your questions. See page 10 for contact information.*

USER GROUP TIP

Scrunching Ami Pro Graphics

Ami Pro files containing graphics can take up lots of disk space. Luckily, Ami Pro 3.0 lets you reduce the size of the files. From the main menu, choose Tools•User Setup and click Options. Under Graphic Display Speed Options, select Conserve Disk Space. The next time you save a document with an embedded graphics image, the resulting file won't be so big.

Steve Vincze
Winnipeg PC User Group



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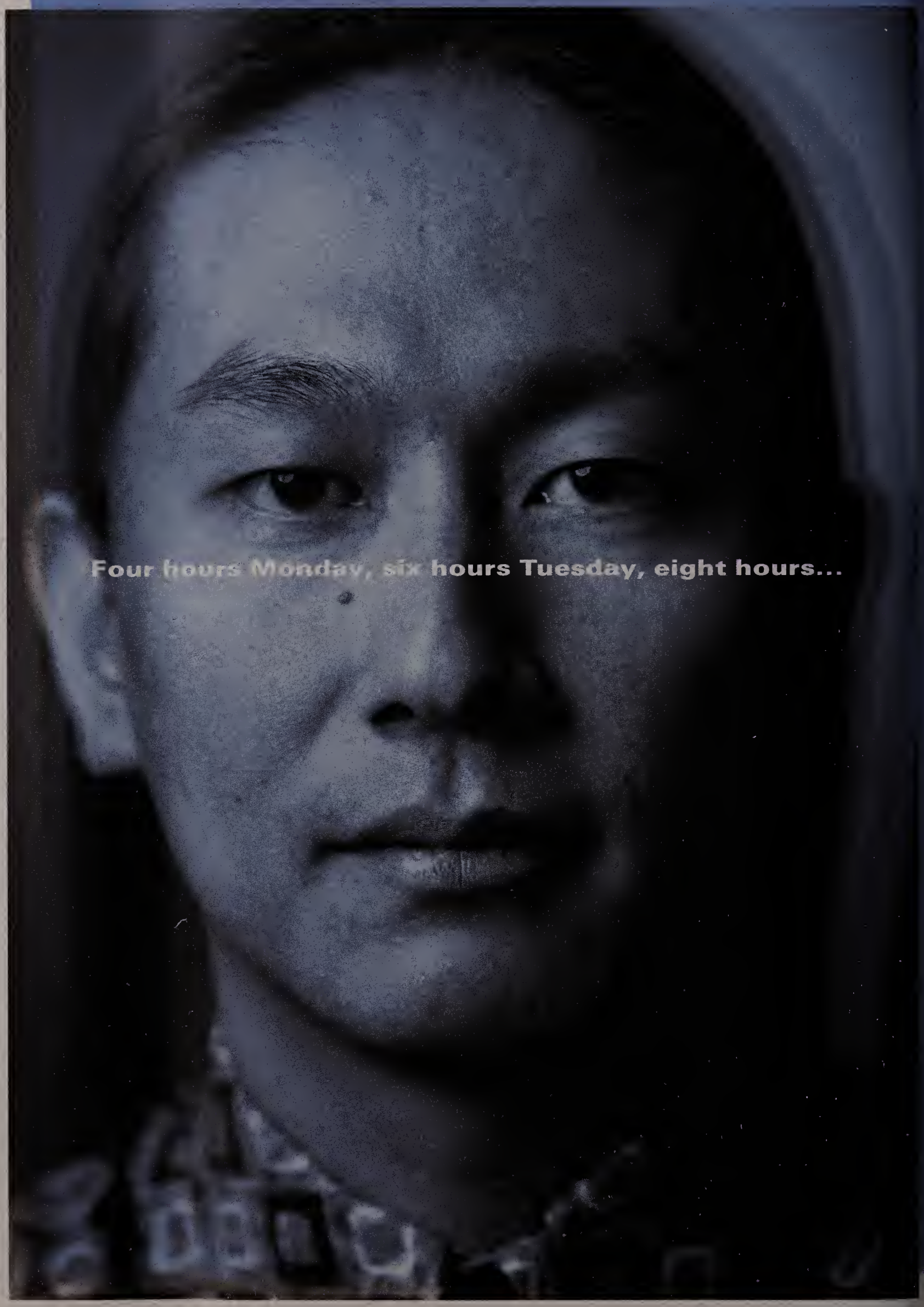
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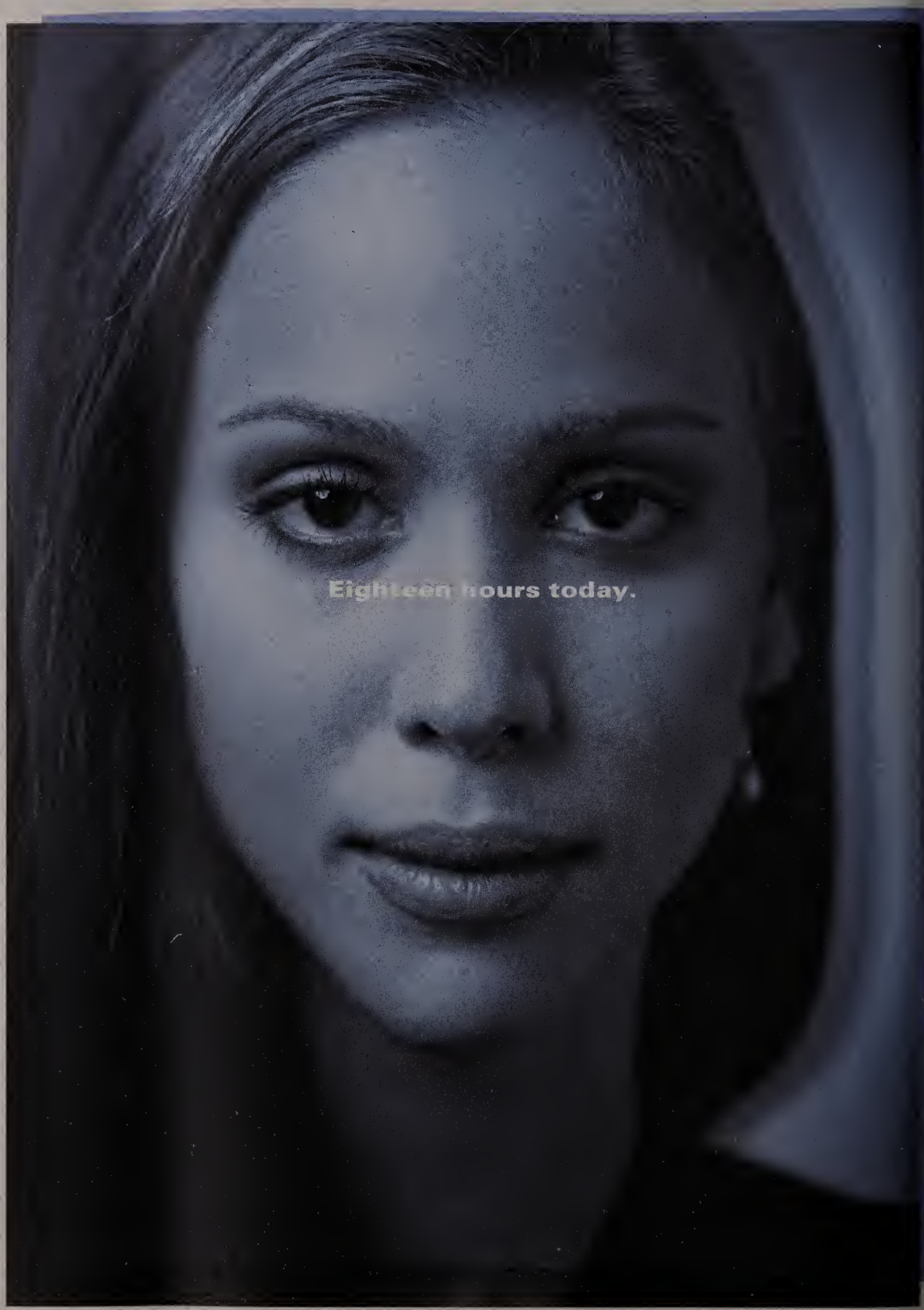
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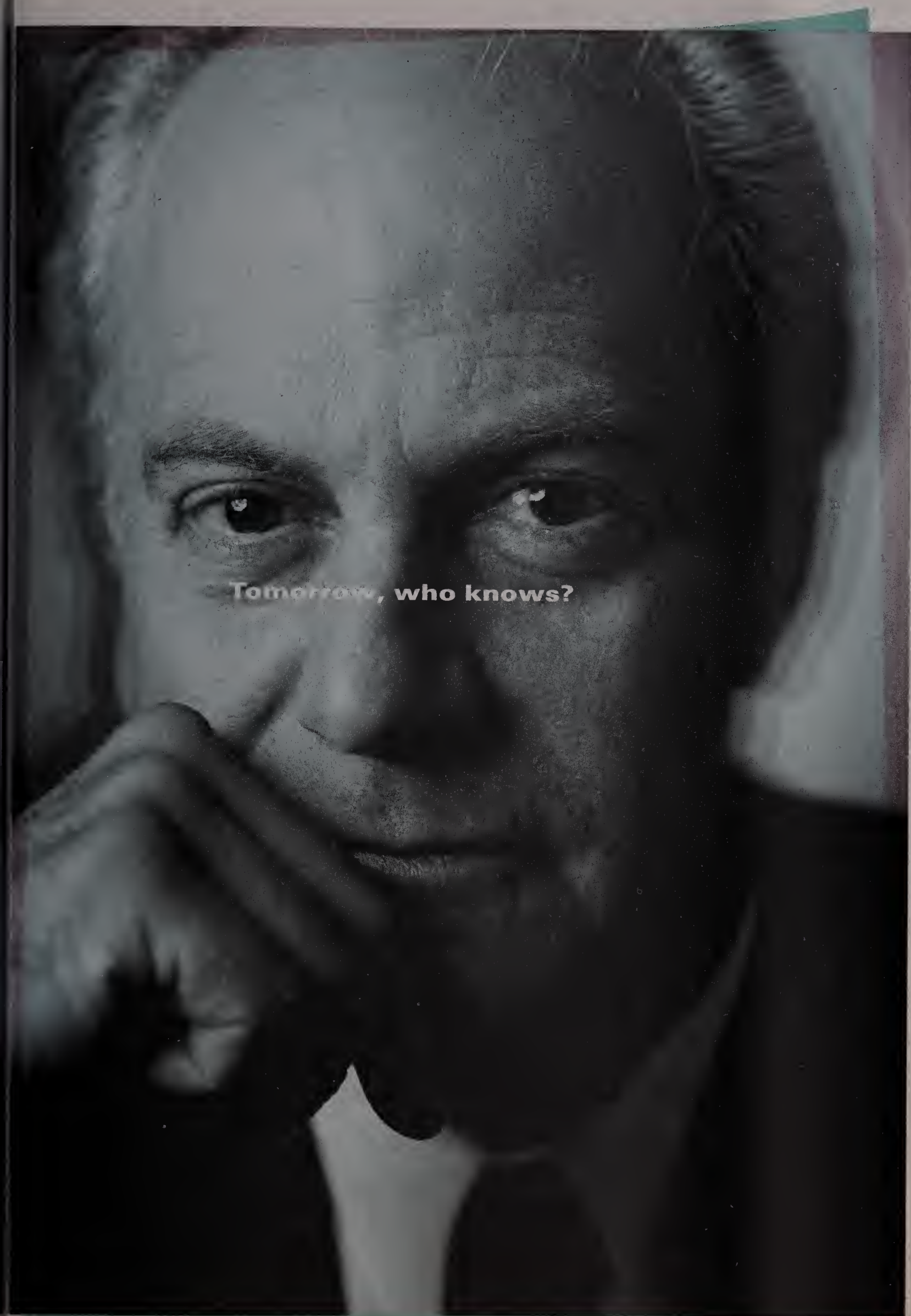
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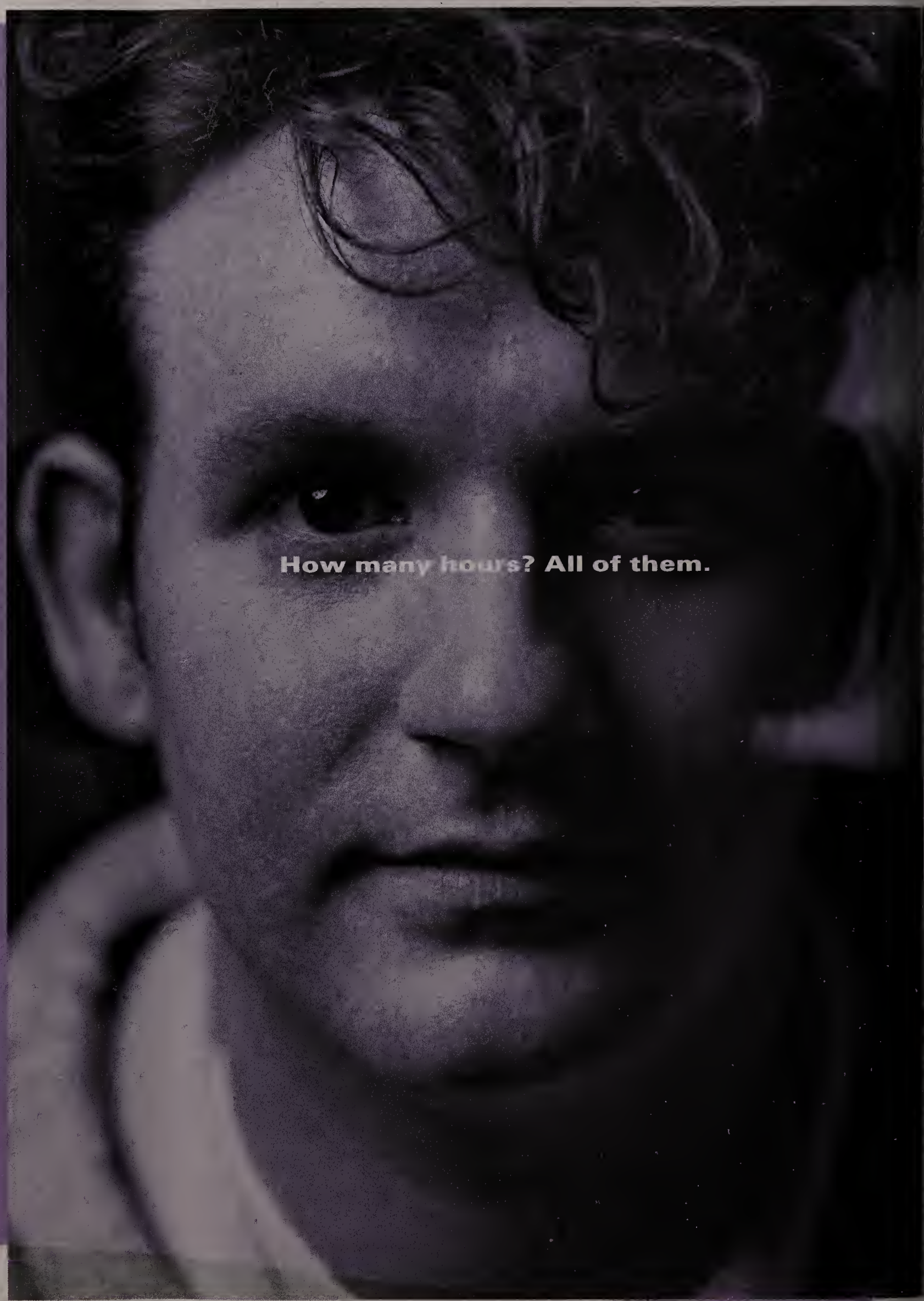
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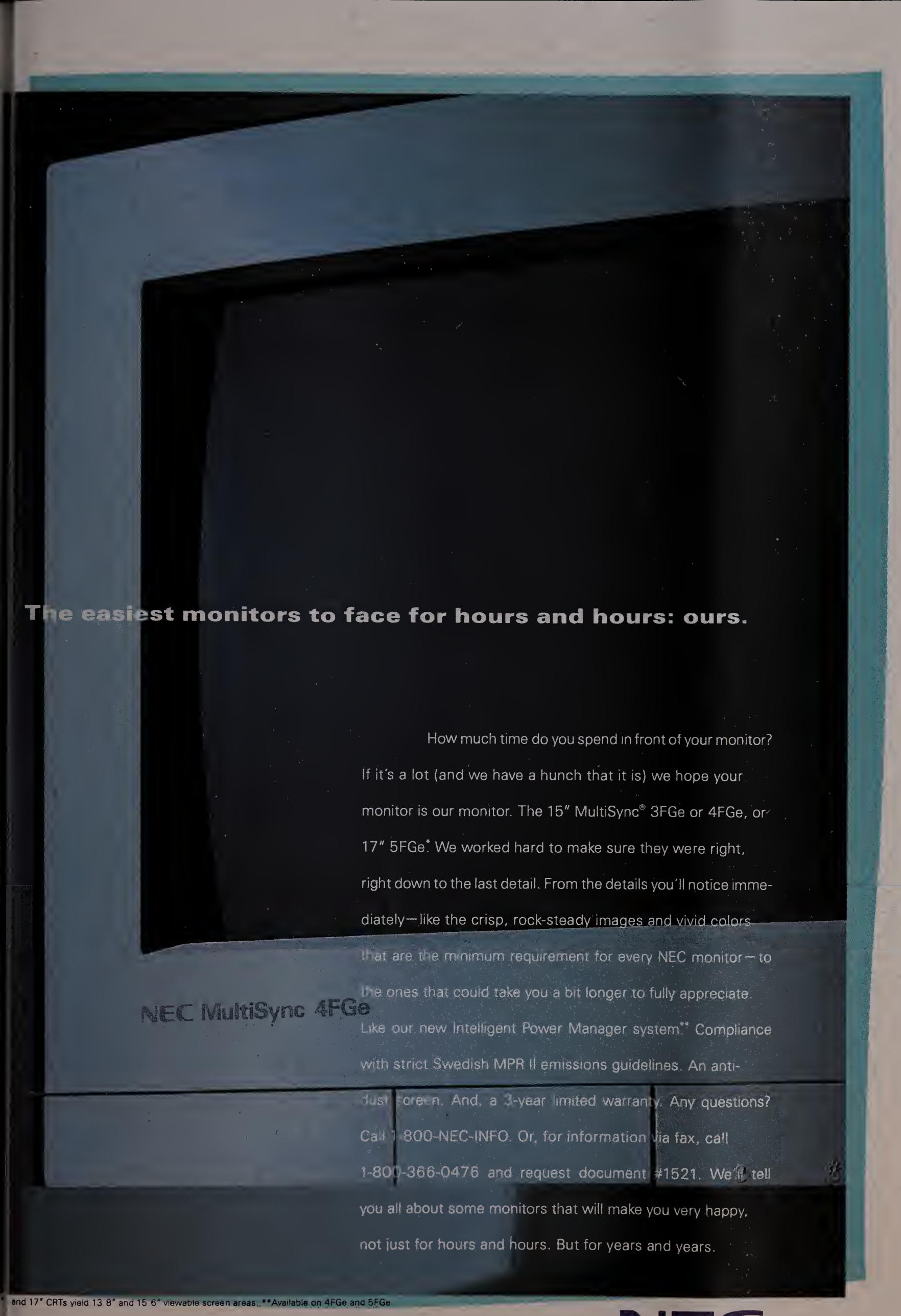
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WINDOWS Q & A

Printing File Manager Listings

Q Is there any way I can print a File Manager directory listing? This would be handy for disk labels and other tracking purposes.
Bob Funk, Bakersfield, California

A To do this job right, you need to turn to trusty DOS and the control panel on your laser printer. First change the default symbol set on your laser printer to PC 8 and select a font like Courier or CG Times. (The Line Printer font won't produce as good a result.) Then double-click the MS-DOS Prompt icon in Program Manager. At the DOS prompt, type **TREE** *d***>PRN**, where *d* is the drive you wish to view, then press **<Enter>**. Then type **ECHO** and a space. Press **<Ctrl>-L**, type **>PRN**, and press **<Enter>**. This sequence of commands runs DOS's TREE utility, redirects the output to the printer, and ejects the last page. In a thrice, out pops a picture-perfect schematic of the directory tree. If you want to include files in the listing, type **TREE/F >PRN** instead.

If your printer won't allow you to change the symbol set, here's a less graphic but workable approach. At the DOS prompt, follow the steps listed above, but insert **/A** before >PRN. As before, type **ECHO** and a space. Press **<Ctrl>-L**, type **>PRN**, then press **<Enter>**, and you'll get your printout.

Quick Copies From Windowed DOS Apps

Q With Windows 3.0, it was easy to copy text from a windowed DOS program: You dragged the mouse to select text and chose *Edit•Copy* from the DOS window's control menu. But with Windows 3.1, I have to choose *Edit•Mark* before I can select anything. Is there some way to make 3.1 work like 3.0?
Julie Snow, Butte, Montana

A Microsoft modified the mouse behavior in 3.1 because of user complaints. In 3.0, a full-screen DOS program retained control of the mouse, provided you loaded the necessary DOS mouse driver first. But if you put the DOS program in a window, mouse control was ceded to Windows. To make things consistent in 3.1, the mouse by default stays with the DOS application in either mode, which makes cutting and pasting data a bit clunkier.

The fix? From Program Manager or File Manager, select *File•Run* and type **SYSEDIT** to open the System Configuration Editor. Click on the SYSTEM.INI window and locate the [NonWindowsApp] section. (If the section isn't present, simply create it by typing in this label, including the brackets.) Underneath, add a new line that reads **MouseInDosBox=0**, and save the file. You don't need to restart Windows, but you will need to exit and restart any DOS application you would like to mouse around in.

Conserving Windows Resources

Q I run several Windows programs on my 386SX with 8MB of RAM. When I start Windows and select Help• About Program Manager, I'm told that I have about 85 percent system resources available and (naturally) less when I'm running other programs. But when I exit all the programs and check the system resources, I always have less than 80 percent. The longer I use or stay in a program, the lower my resources when I exit—as low as 65 percent. Where are all my system resources going?
Tim Bayless, Bloomington, Indiana

A Windows doesn't simply juggle everything it does within one big clump of extended memory. Two of its core programs, GDI.EXE and USER.EXE, handle Windows' graphics, printing, menus, and I/O functions (the system resources) and have only 192K to do it in. The percentage of system resources available is the amount of that 192K that's still free. When that space gets full, strange things happen: out-of-memory messages, sluggish performance, icons that won't display, and more.

Well-behaved apps are supposed to relinquish the system resource space they're using when they exit. Unfortunately, not all of them are so well mannered, and the result is the gradual depletion of system resource space.

Nevertheless, there are ways to conserve resource space. Run fewer programs and take unnecessary applications out of Program Manager's StartUp group. Open fewer document windows in a single program. Avoid displaying unnecessary status lines and button-studded tool bars. Don't start and exit the same application several times each session. Remove fonts you don't really

Windows Toolbox

When Windows' system resource space gets full, or you want to recover the memory filched by a crashed application, you must restart Windows or reboot your computer. A lot of utilities perform this vexing task, but my fave is a handsome piece of freeware called Restart Windows 1.0. Run it like an ordinary application and you can pick from three buttons: Restart, Exit, or Reboot. Run it minimized on the desktop, and you can execute these same commands from its control menu. Restart Windows (RESTRT.ZIP) requires the runtime version of Visual Basic (VBRUN200.DLL). Both files are available on PC World Online's Featured in December folder and on other online services. Developer Cecilia Wong can be contacted via CompuServe at 76655,344.

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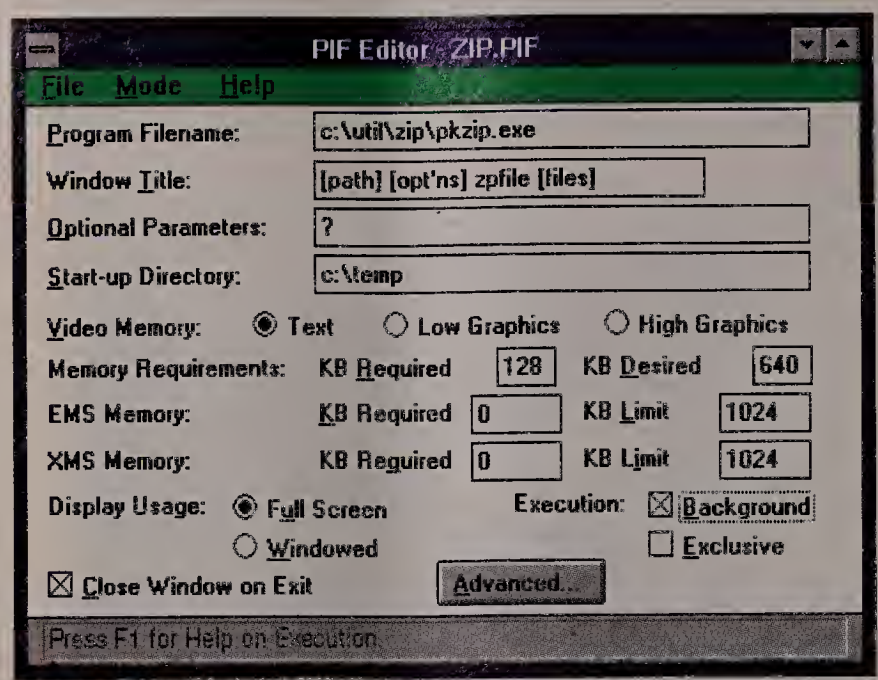

A DOS PROGRAM CAN PROMPT you for parameters. Just type a question mark in its PIF's Optional Parameters box.

need (both PostScript and TrueType). Finally, run Windows in 8-bit (256-color) rather than 24-bit (16.8 million-color) mode except when necessary. Of course, the only surefire way to completely free that 192K is to restart Windows. For a quick way to do that, see "Windows Toolbox."

Faster File Manager Access

Q So many programs have installed their INI files, DLLs, and who knows what else that my WINDOWS directory now contains hundreds of files. Scrolling through this directory in File Manager to find anything is time-consuming. And when I first select the WINDOWS directory, it takes File Manager forever to display a file list. How can I speed things up?
Will Bradford, Portland, Maine

A You can mitigate this problem two ways: First, do some housekeeping in your WINDOWS directory. Second, create some custom directory windows in File Manager.

In the clean-up department, move all text files (TXT, WRI, and DOC) to other directories. You can relocate accessories such as Calculator, Calendar, and Solitaire (namely, their EXE and HLP files), and move PIFs as well. (Note: Some third-party programs insert references in WIN.INI or require certain files to remain in the WINDOWS directory; consult your documentation or software vendor if you're unsure.) Make sure program and related help files stay in the same directory or in directories referenced by the PATH statement.

The next step is creating custom directory windows dedicated to specific file extensions and views. The task is fairly easy, thanks to File Manager's ability to remember previously opened windows.

Let's say you want to create a special window that shows only INI files. If you normally use a single, maximized directory window, select *Window•Cascade* to place it in a window. Double-click the drive icon where your WINDOWS directory exists; this creates a second directory window.

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Double-click the WINDOWS directory in this second window, then select *View•By File Type*, type ***.INI** in the Name field, and click *OK*. Since you won't use this window for navigating to other directories, choose *View•Directory Only*. Finally, clear the area temporarily by minimizing this new directory window.

Repeat these steps, creating new windows for each file extension you would normally hunt for in the WINDOWS directory. Then restore all your new directory windows (by double-clicking the appropriate icon at the bottom of the screen), arrange them on screen as you desire, and save this configuration by pressing **<Shift>** as you select *File•Exit*.

The next time you load File Manager, your custom windows will pop into place and you'll be able to find files in a flash.

Prompting PIFs

Q How can I run PKZip and PKUnzip from Windows? Unlike most DOS programs, these utilities require parameters to run. Can I add this information to the Program Item Properties dialog box when I create icons for PKZip and PKUnzip?
Maxine Mandel, Syosset, New York

A You could, but it won't help you with PKZip and other programs that demand different multiple parameters (such as input and output file names) every time they run.

With PKUnzip, however, you don't need to create an icon if you're just unzipping files. Simply associate the ZIP extension with PKUNZIP.EXE, and you'll be able to unzip files just by double-clicking them in File Manager. The steps: Load File Manager, select a file with the ZIP extension, and choose *File•Associate*. In the Associate With line, type the drive, path, and executable file name for PKUnzip—such as **C:\UTIL\ZIP\PKUNZIP.EXE**—and click *OK*. Now whenever you want to unzip a ZIP file, simply double-click the file name in File Manager.

To run PKZip from a Windows icon, you must create a PIF that prompts you for parameters. Load the PIF Editor, and in the Program File name line type the drive, path, and executable file name for PKZip. At the Start-up Directory line, enter a destination; otherwise zipped files will be saved in the WINDOWS directory by default. Type **?** in the Optional Parameters line; this forces Windows to ask for your input when it runs PKZip. Select *File•Save As* to name and save the PIF. Exit the PIF Editor.

Now switch to Program Manager and create an icon for PKZip. Select *File/New*, make sure the *Program Item* radio button is filled, click *OK*, and enter the PIF's name in the Command Line field of the Program Item Properties dialog box. Don't enter anything in the Working Directory field—it will override the Start-up Directory setting in the PIF. Press **<Enter>**, and that's it. Use these steps to create prompting PIFs for any DOS application that needs unique parameters at start-up.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows *welcomes your questions. See page 10 for contact information.* ■

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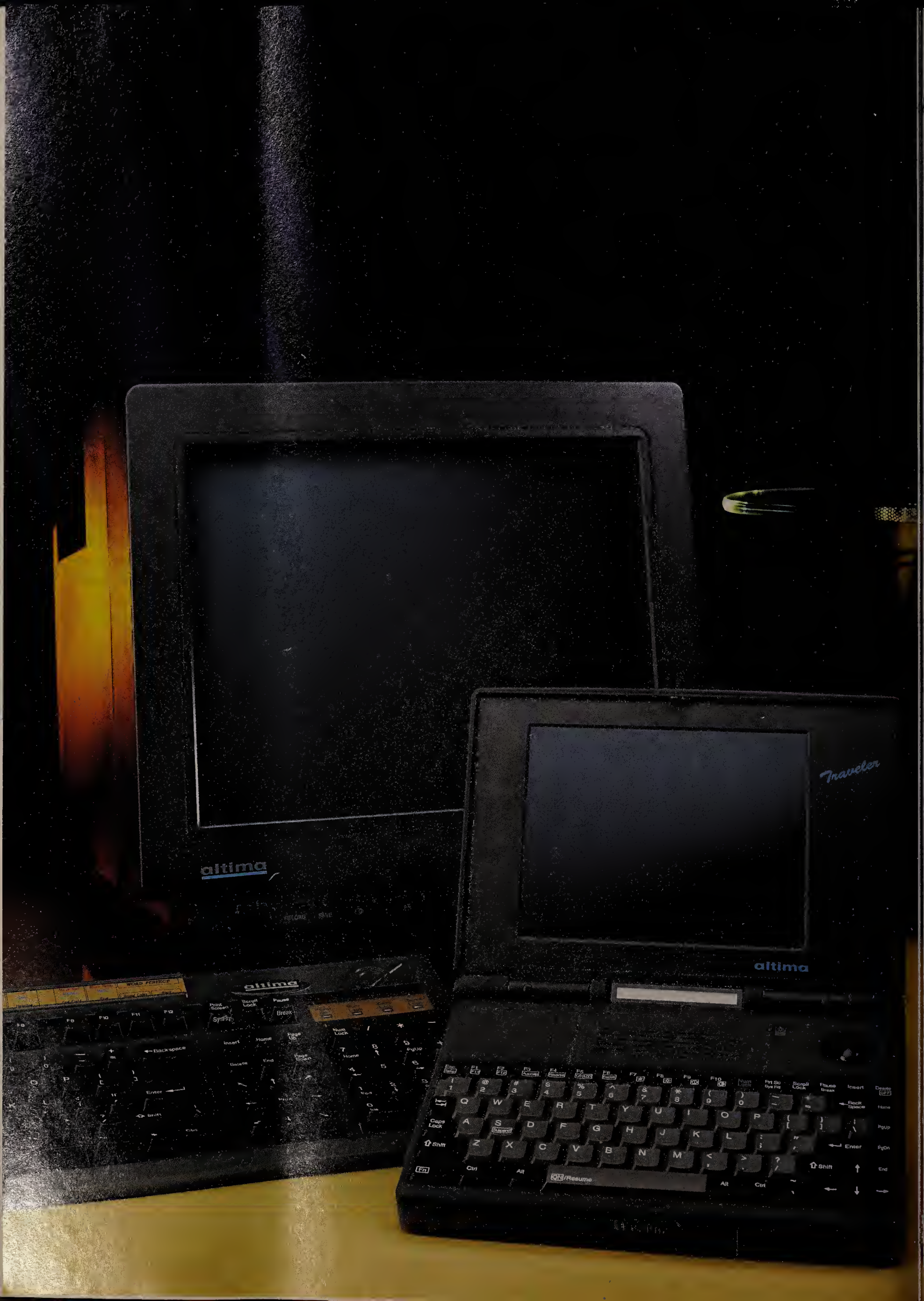
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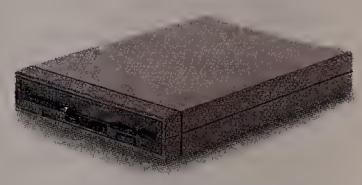

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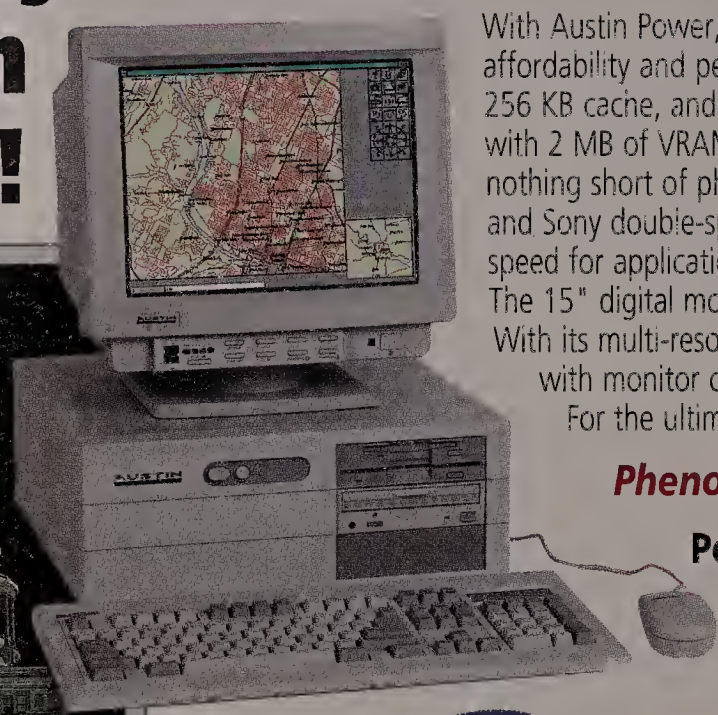

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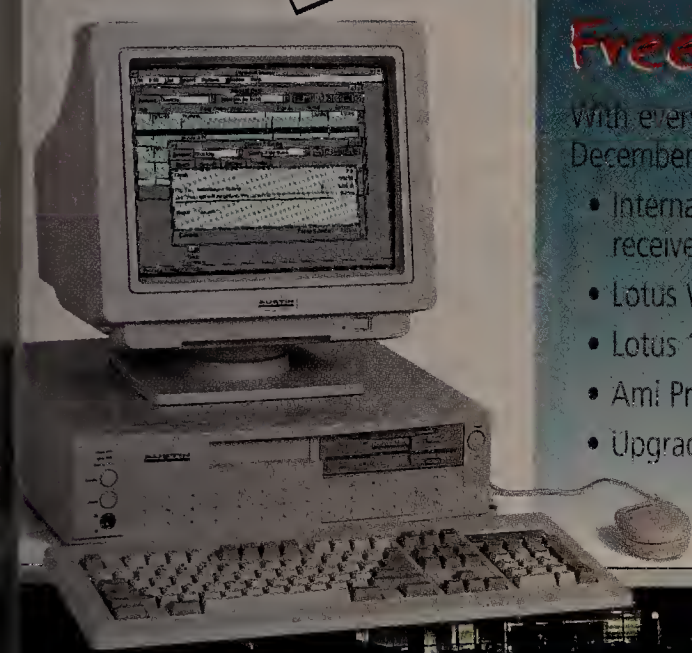

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DATA MANAGEMENT Q & A

Printing Records in Columns With dBASE

Q Is it possible to generate a report in dBASE IV that lists records in three columns? I'd like to see the records snake down the first column, then into the second, and finally into the third.
Robert A. Powell Jr.,
Allendale, New Jersey

A Try using a label format instead of a report format. This isn't a perfect solution since the records are printed from left to right and then top to bottom, instead of top to bottom and then left to right. But if that will work for you, here's how to do it.

Open the data file you want to print and select *Labels•<create>* on the Control Center menu. When the Label Design screen comes up, use the options on the Dimensions menu to pick a predefined layout or to create one of your own. Then add any fields and text that should be part of the design to the small window in the middle of the screen. You'll see the layout for only one record on the screen, but you can use *Print•View labels on screen* to preview the full report.

IIF You Need a Paradox Subtotal

Q I have a Paradox 4.0 multitable form for entering sales. The form's master table is called SALES, and there's an embedded form from the DETAIL table inside. The form includes lookups to my CUSTOMER and INVENTRY (inventory) tables.

My problem concerns the calculated fields for each DETAIL record's price and subtotal in the embedded form. I've got an 'A' price and a 'B' price for each item in INVENTRY, with a Price Code field in the CUSTOMER table that identifies which price an order should use. I'm trying to set up my calculated fields so they use the right price from INVENTRY, based on the CUSTOMER Price Code. I've tried using the IIF() function, but it doesn't work. What does? Also, I don't want to show both prices on the form.
Robin E. Snell,
Towanda, Pennsylvania

A Unfortunately, Paradox won't let you refer to a field from the master table in a calculated field in the embedded form. Luckily, you can get around this by referring to a variable in the calculated field and updating the variable automatically with a script like the one in **FIGURE 1**.

Before you run the script, you'll need to do some preparation. First, add fields for your code A and code B prices to the DETAIL table, using the same field names that are in INVENTRY. Then place your calculated fields in the DETAIL form. Assuming your fields are named Code A Price, Code B Price, and Qty, your formulas should be **IIF(pricecode = "A",[Code A Price],[Code B Price])** for the price and **IIF(pricecode = "A",[Qty] * [Code A Price],[Qty] * [Code B Price])** for the subtotal.

Next, create ENTERSLS.SC as an ASCII text file; to use the editor that comes with Paradox, select *Scripts•Editor•New.* Enter the commands in Figure 1, substituting your own file name for 'Sales' in the third line and the name of your price code field for 'Price Code' in the eighth line. You can also download ENTERSLS.SC from PC World Online.

The next time you wish to bring up your form, do it through the script by selecting *Scripts•Play•Entersls;* the calculated fields will match the current price code. Note, however, that if you change the price code for a sale, the script won't display the current numbers until you have moved away from, then back to, the form. Also, if you view the multitable form using Paradox without the script, you'll get incorrect numbers, although they'll be correct when you next use the script.

```
pricecode = ""
CLEARALL
EDIT "Sales"
PICKFORM "F"
SHOWPULLDOWN
ENDMENU
WHILE True
 pricecode = [Price Code]
 WAIT RECORD
  PROMPT "[F3] Detail  [F2] Do-It!"
 UNTIL "F2","F3","PgUp","PgDn","Home","End"
 SWITCH
 CASE retval = "PgUp" : PGUP
 CASE retval = "PgDn" : PGDN
 CASE retval = "Home" : HOME
 CASE retval = "End"  : END
 CASE retval = "F2"   : DO_IT!
                        QUITLOOP
 CASE retval = "F3" :
    DOWNIMAGE
    WAIT TABLE
     PROMPT "[F4] Top  [F2] Do-It!"
    UNTIL "F4","F2"
    IF retval = "F2"
     THEN DO_IT!
          QUITLOOP
     ELSE UPIMAGE
    ENDIF
 ENDSWITCH
ENDWHILE
```

FIGURE 1: DO CONDITIONAL PRICING—keyed to the customer—with this Paradox script.

Finding Dupes in Paradox for Windows

Q I have a Paradox for Windows table keyed by Social Security number and last name, and I need to find duplicate entries. Because names can be misspelled, I want to display SSNs and names for all records with SSNs that aren't unique. I can't figure out how to accomplish this.
Valerie Hewett, Coppell, Texas

A You'll need to perform two queries to get your answer: one to get a list of Social Security numbers that are duplicated in your table and another to link the result of the first query to the origi-

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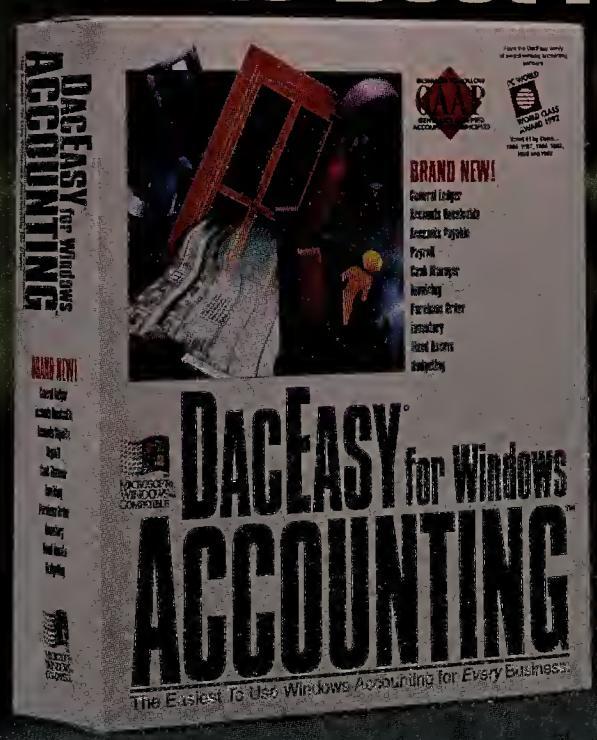

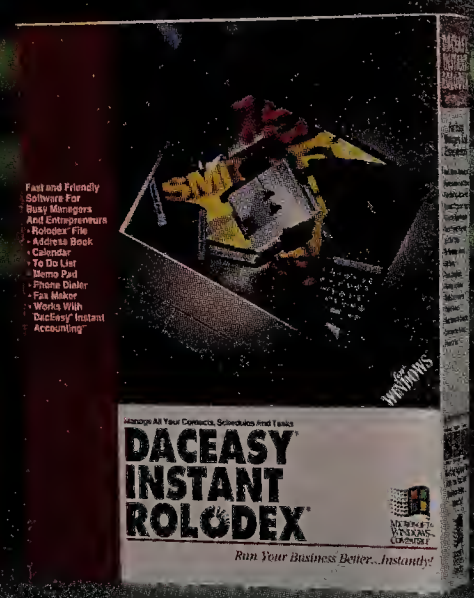

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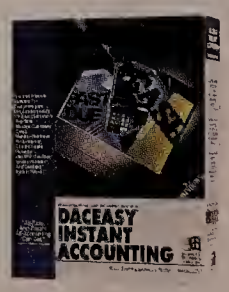

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nal table and thus list the names as well. First open a query window for the table in question, check just the SSN field, and type **COUNT > 1** in the last-name field. Run the query to get an ANSWER table of the duplicate SSNs.

Now you can do the second query. Return to the query window and delete the criteria from the last-name field. Then use *Query•Add Table* to add an image for the ANSWER table to the query window. Next click the Join Tables SpeedBar button shown here and then the SSN field in both query images; Paradox will place an "example element" called EG01. in the SSN fields. Finally, in the query image for the original table, check the last name and any other fields you want to see in the ANSWER. When you run the query, you'll get the list of duplicates you want.

Avoiding Duplication With FileMaker Pro, Part II

In "Avoiding Duplication of Data With FileMaker Pro" (August 1993), librarian Francine Heiks asked how to make a card catalog database in which she could enter several subjects for each book and then print cards for each subject listed for each book. I told her she had to duplicate each record and change the subject, thus creating separate records for each card needed. Bob Randolph of Philpot, Kentucky, sent me a better solution.

The trick is to make the Subjects field something that FileMaker Pro calls a *repeating field*, which allows you to enter multiple items into it. With your data file on screen in Browse mode, choose *Select•Define Fields*. Select the Subjects field, and then click *Options*. In the dialog box that results, check the Repeating field box and enter a maximum number of fields—**6** would probably be sufficient. Click *OK*, then *Done*.

Back at the editing screen, choose *Select•Layout* and click the Subjects field. Select *Format•Field Format;* in the resulting dialog box, click the field for the number of repetitions and enter **6** again. Click *OK* and then select *Select•Browse* to return to the editing screen. As you enter and edit your data, you will now be able to enter multiple subjects for each book.

Before you can print cards for each subject, however, you must create a temporary file in which each Subject item has its own record. With the original file open in Browse mode, select *File•Save a Copy As*. In the resulting dialog box, select *clone (no records)* from the 'Save a' drop-down list, enter a name, and save the new file. Next, open your temporary file and select *File•Import/Export•Import Records*. Double-click the name of the original file, click *OK* in the first resulting dialog box, and change the setting in the next dialog box to *Splitting them into separate records* before clicking *OK* again. You'll now have a file with each repeating detail in a separate record, making it easy to print your cards.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).* Data Management *welcomes your questions. See page 10 for contact information.* ■

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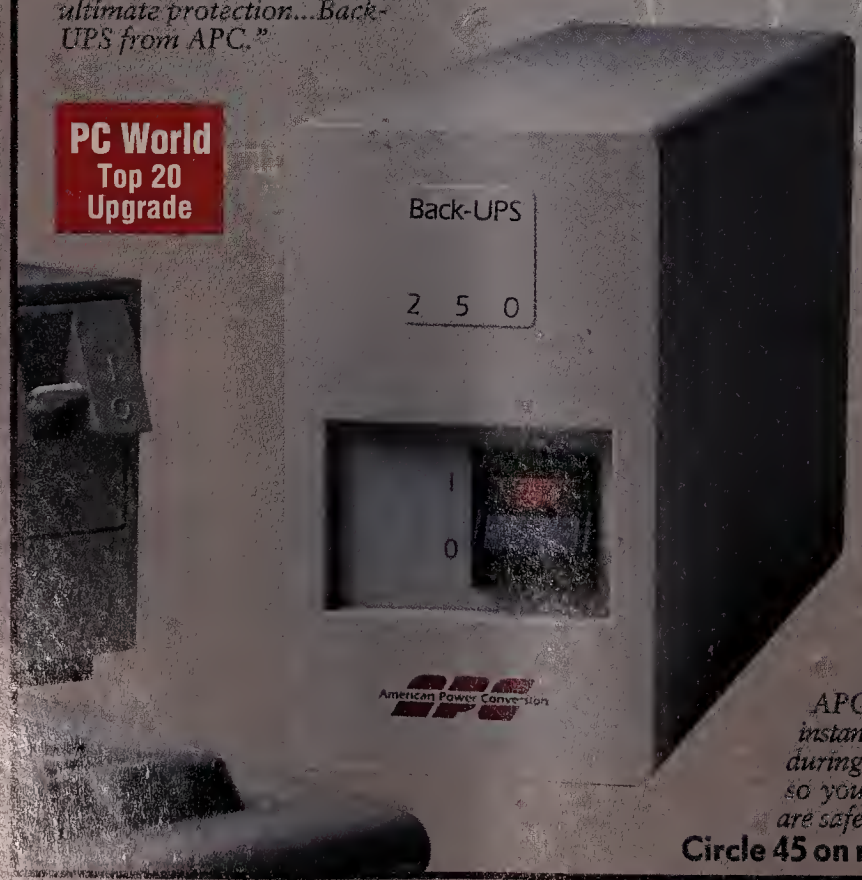

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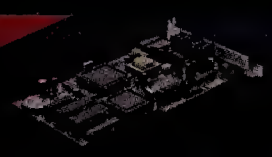

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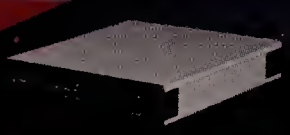

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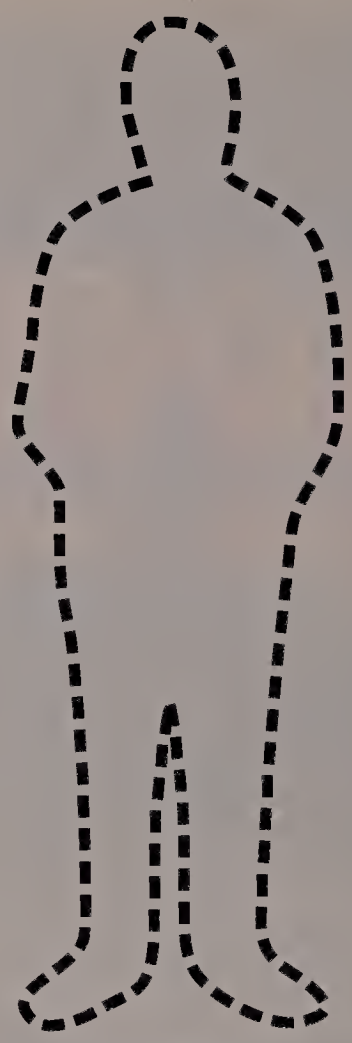

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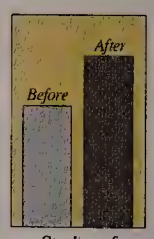

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PUBLISHING & PRESENTATIONS Q & A

Noteworthy PowerPoint Handouts

Q I want to use Microsoft PowerPoint 3.0 to create handouts with one slide at the top of each page and some blank lines below it to make it easier for the audience to take notes. I also want to include headings within the lines. What's the easiest way to do this?
Tracy Gebbi, Grand Rapids

A Because PowerPoint's automatic-handouts feature prints copies of your presentation with two, three, or six slides per page, the speaker notes feature is a better choice for producing custom handouts. PowerPoint's default layout for speaker's notes is made-to-order for this job: It provides a copy of one slide on the top half of each page, with ample room for entering text below it. To add your note-taking form to each slide, you simply type in your headings and blank lines and place them on the Notes Master page. Here are the steps:

1. Open your PowerPoint presentation and select *View•Notes* (or click the *Notes View* button). PowerPoint displays your first slide on the top half of the Notes page above an empty box marked by dotted lines (called the *body object*). You'll use this box to create the note-taking form.

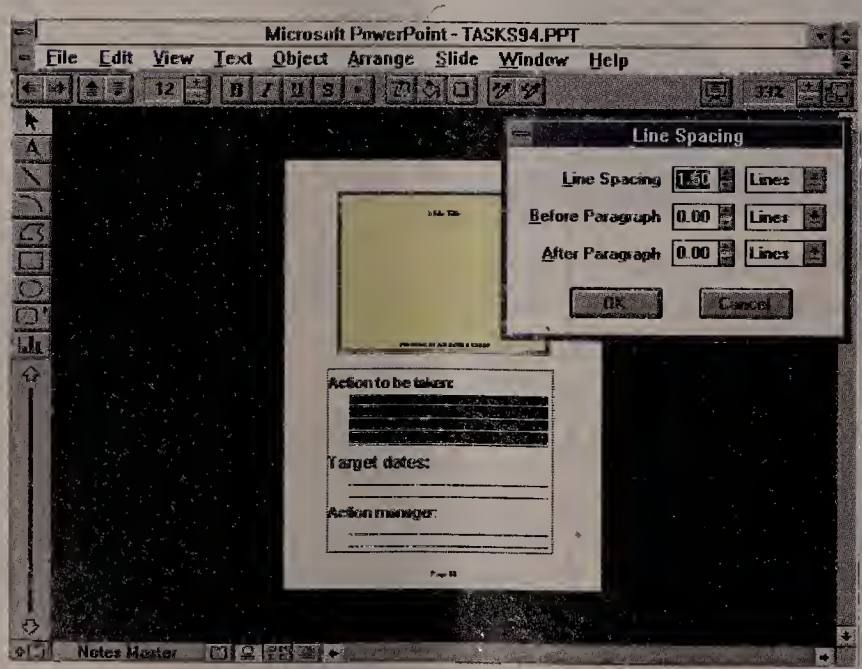
2. Click anywhere inside the box to select it (a gray selection box will surround it), and click again to insert the I-beam pointer at the start of the first line. Now create the form by typing your headings and using the underline character to add blank lines. If the text is too small, you can increase its size by pulling down the View menu and selecting a different viewing scale, such as *Actual Size*.

3. As you create the form, PowerPoint formats the text—type size, alignment, indents, and so forth—according to the defaults set on the Notes Master page. However, you can override these defaults by highlighting the text that you want to change and selecting options from the tool bar or Text menu. For example, to provide extra space for handwritten notes between lines, highlight the blank lines, select *Text•Line Spacing*, and then adjust the spacing as you wish.

4. Once you've finished creating the form, you'll want to delete it from the Notes page and paste it on the Notes Master page. Click the Selection tool (the arrow) in the tool palette, and select the form by clicking on it (once again, the gray selection box should surround it). Select *Edit•Cut* to remove it from the Notes page.

5. Select *View•Notes Master* to go to the Notes Master page, which contains a slide placeholder and the *master body object*—a box with sample text in it (such as "Body Text, Second Level, Third Level"). Select *Edit•Paste*, and PowerPoint automatically pastes the finished form on top of the master body object. Although the sample text will still be visible below the form, it won't print on the actual Notes page.

From now on, the same form will appear on every Notes page, which you can print for audience handouts. To edit or delete the form, you must go to the Notes Master page. Finally, although you can delete the master body object from the Notes Master page, you probably should keep it intact in case you want to delete your custom form later and use PowerPoint's speaker notes as originally designed.



POWERPOINT'S SPEAKER NOTES make effective handouts. Increasing the line spacing makes it easier for your audience to take notes.

PageMaker Boards the TWAIN

Q I've used a Microtek ScanMaker 600Z with Aldus PhotoStyler for years to scan and save images I use in my PageMaker and CorelDraw documents. But I've heard that the latest versions of both these programs provide their own scanner support. Does that mean I can finally use my scanner from inside PageMaker and CorelDraw?
Freda Newtret, Trenton

A The answer is yes—*if* your scanner has a software driver that supports TWAIN. TWAIN is an imaging protocol that lets you control optical input devices—such as scanners, digital cameras, and video-capture boards—from inside any software application that supports the TWAIN standard.

Although your scanner was produced before TWAIN's introduction in the fall of 1992, you can obtain an updated software driver from Microtek (800/654-4160 or 213/321-2121) for about $25. Readers who have older scanners from AVR, Hewlett-Packard, and others can also contact the manufacturers to obtain drivers that support TWAIN. These days, most new scanners come bundled with TWAIN-compliant software, so if you bought a scanner recently you probably won't need an upgrade.

As mentioned, the big advantage to TWAIN-compliant applications is that you can scan in an image without leaving the program you're working in. The location of the actual menu option for using a TWAIN device will vary, depending on the program and device. For example, here's how you'd scan images directly into PageMaker 5.0:

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1. Select *Utilities•Aldus Additions•Acquire image.* (If you didn't install the Acquire image addition when you installed PageMaker, run Aldus Setup, select *Additions,* click *Setup,* and select *Acquire image.*) If more than one TWAIN imaging device is available, PageMaker prompts you to select the device you want. Choose a device (such as Microtek Image Scanner) and click *OK.*

2. In the resulting PageMaker dialog box, name the file, specify where the scanned image should be saved, and then click *OK.*

3. At this point, PageMaker brings up the device-specific scanning software dialog box. The options available depend on the TWAIN device installed, but most scanners provide controls over scan mode (such as color, gray scale, line art), resolution, scaling, and other features. Specify the options you want, and click the button—such as *OK* or *Scan*—that allows you to begin scanning.

4. After you've finished scanning, PageMaker's pointer tool changes to a shaded rectangle, which you use to place the scanned image on the page.

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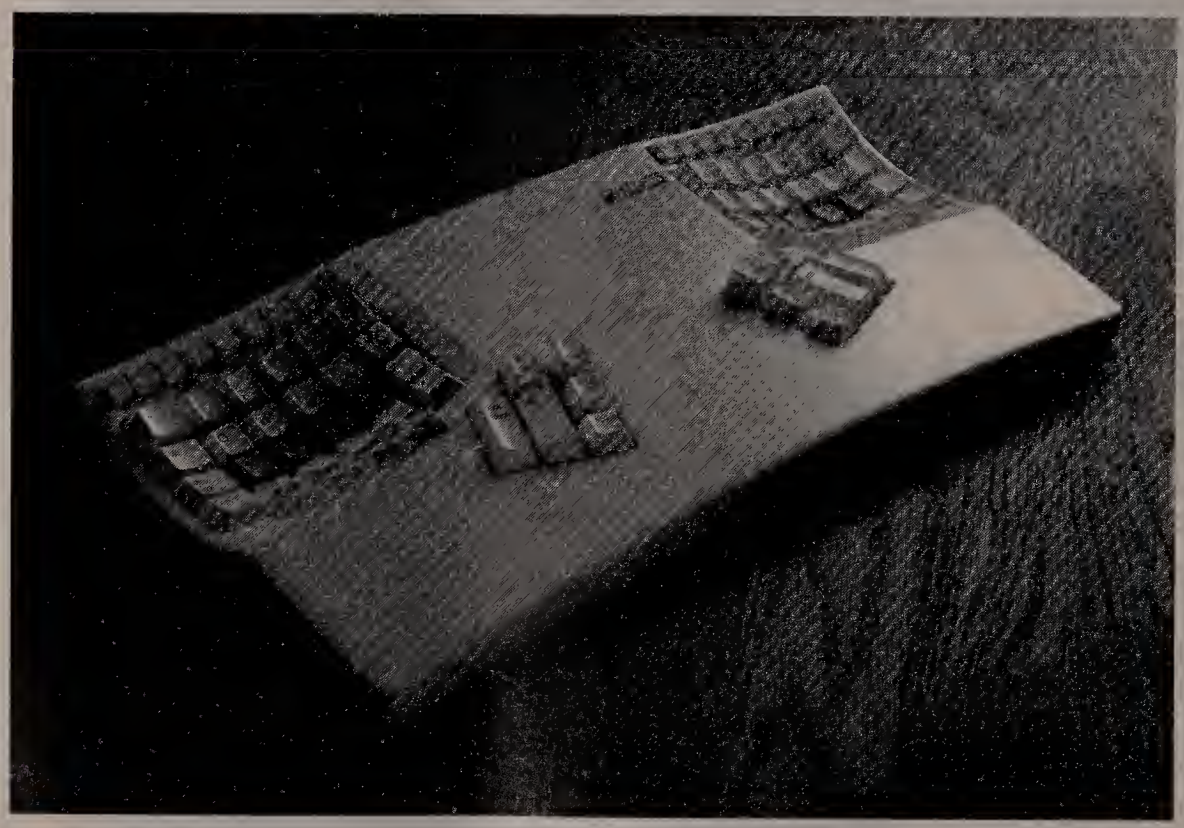

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Separating Ventura's Extensions

Q I upgraded to Ventura Publisher 4.1 for Windows so I could use the scanning and color-separator extensions that come with it, but I don't use them every time I use Ventura. Can I stop Ventura from loading these programs when I don't need them, since they take extra time to load?
Charles Wright, Richmond

A Although Ventura doesn't provide a way to disable its extensions through its Edit•Set Preferences command, here's a work-around that will do the job.

Whenever you run Ventura Publisher, it loads the various Dynamic Link Library (DLL) files installed in the VENTURA directory, where all of Ventura's program files are stored. If you've installed Ventura's Scan and Separator extensions, Ventura will load a separate DLL file for each: SCAN-.DLL and VPSEPS.DLL, respectively. But if you move those two DLL files to another location, Ventura will no longer load the extensions or add the Extension menu when you start the program.

The easiest way to accomplish this work-around is to use Windows' File Manager:

1. Fire up File Manager and double-click the *VENTURA* directory. Select the *SCAN-.DLL* file with the mouse, hold down the **<Ctrl>** key, and select *VPSEPS.DLL.*

2. Select *File•Move.*

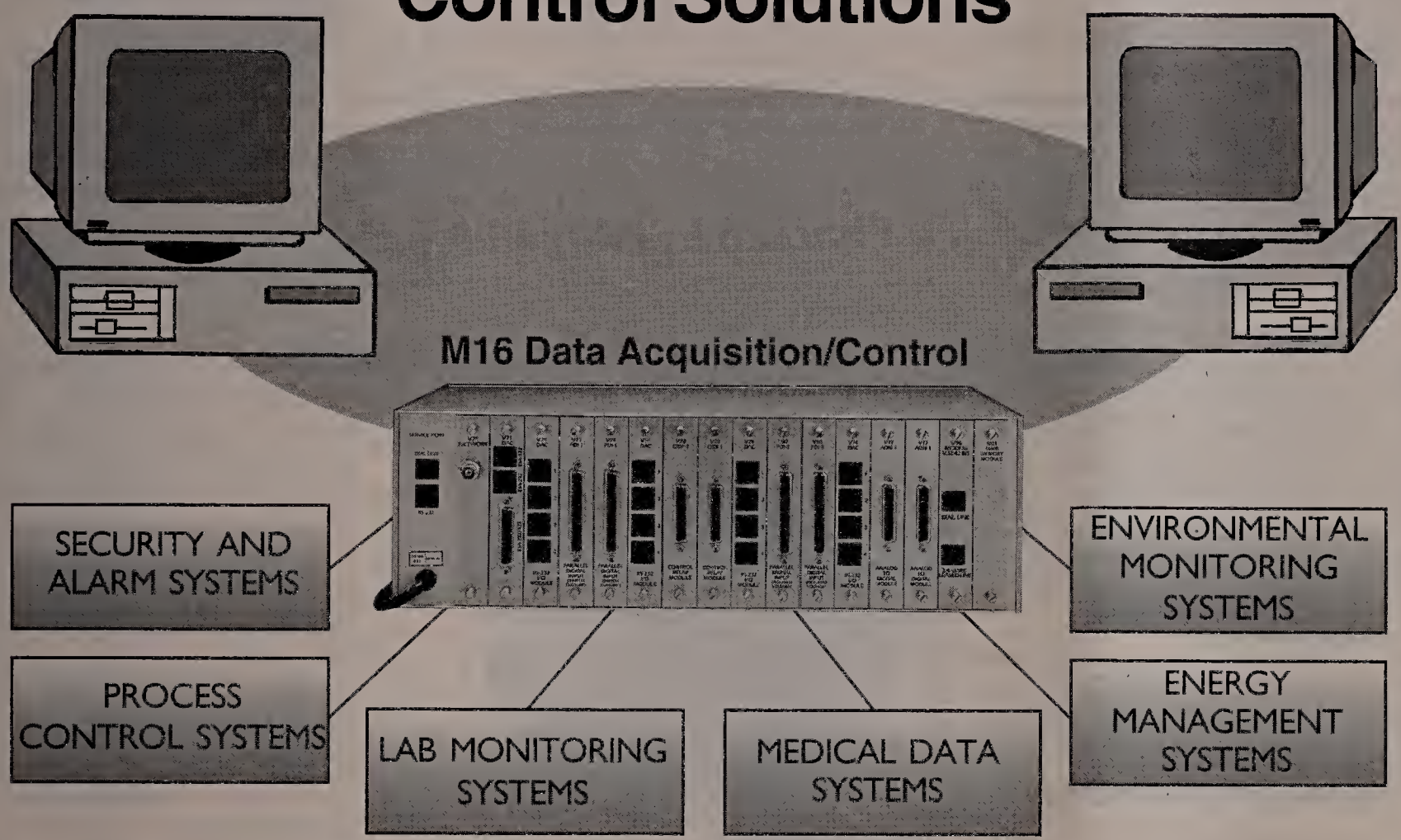
3. In the Move dialog box, type the path and name of a new directory where you want to store the DLL files—for example, C:\VENTURA\EXTEN. Press **<Enter>** to confirm the creation of the directory.

From now on, Ventura will start faster since it won't be loading the Scan and Separator extensions. When you want to use either extension, simply use File Manager to move or copy the appropriate DLL file back into the VENTURA directory.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations *welcomes your questions and make-over candidates. See page 10 for contact information.*

Connectivity, Only One of the Powerful Features of our New Data Acquisition/ Control Solutions



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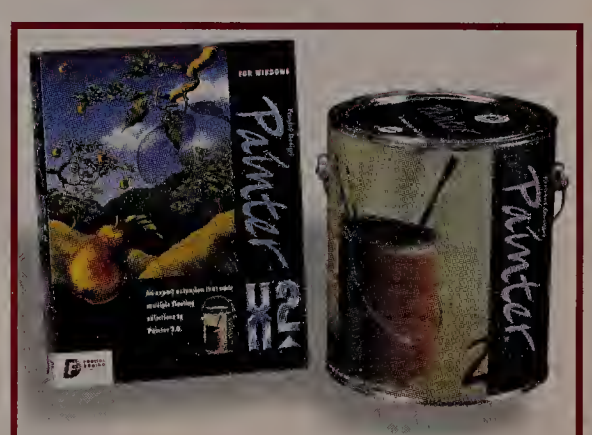

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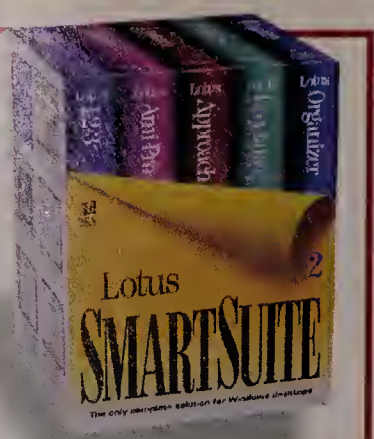

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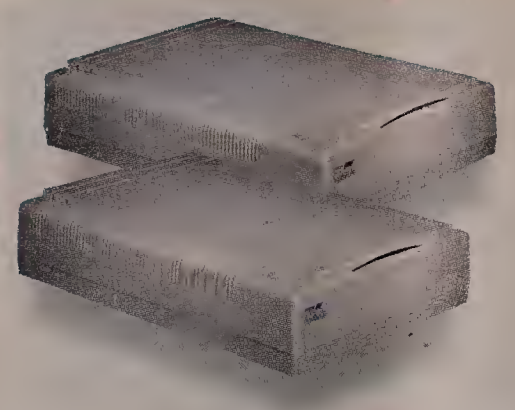

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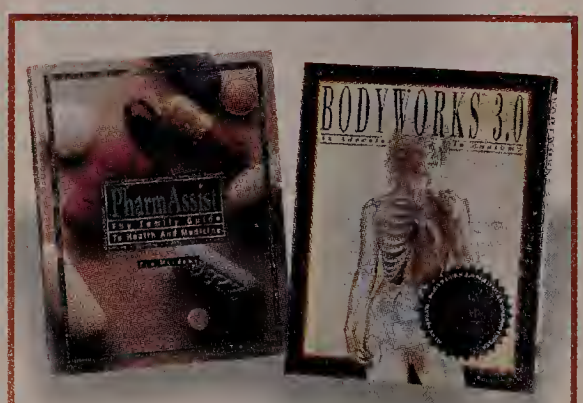

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COMMUNICATIONS Q & A

New Modem Woes

Q I recently purchased a Cardinal 2400 MNP modem that came with QuickLink communications software. I have tried to get QuickLink to work with the modem, but the software gives me 'ERROR' whenever I fire it up. I wrote to Cardinal but received no answer. QuickLink's default modem initialization string is AT&FE1V1X4&C1 &D2S0=0S2=43. The modem's manual suggests ATN3V1Q3J0C1%C0. If I use this, nothing happens. I have tried combining both strings and having QuickLink issue them to the modem, but I still get 'ERROR' on screen.
Bob Foiles, Cockeysville, Maryland

A Your problem is not uncommon: Your modem, like most on the market, deviates from the Hayes standard in some subtle way. That's why the command string recommended by the manufacturer includes some nonstandard hieroglyphics.

Some communications software includes a custom modem initialization string designed to work with the Cardinal modem. Since yours doesn't (and since QuickLink isn't a great package), I recommend that you try another package, such as Procomm Plus by DataStorm (314/443-3282); it supports a lot of modems and is much easier to use. All of your problems might evaporate right there.

While waiting for your new software to arrive, make sure that the modem works properly. To check it, go to QuickLink's terminal screen and type **AT**, then press **<Enter>**. An 'OK' should appear on screen. If you get 'ERROR' instead, the modem is defective and should be returned to the manufacturer.

If your modem passes the AT test, try dialing a phone number manually. To do so, type **ATDT** and then the phone number, and press **<Enter>**. After you hang up the phone, try typing each of the modem commands in QuickLink's modem initialization string and pressing <Enter>, as in **AT&F<Enter>ATE1<Enter>ATV1 <Enter>** and so forth. You should get an 'OK' after each command. If you get 'ERROR' for any command, one of two things could be happening: Either your modem does not support that command (in which case you delete it from the string), or the modem is defective.

If you're feeling ambitious, enter each of the commands in the manufacturer-recommended string and see if the result for each is an 'OK'. Finally, try adding **^M** to the end of the modem initialization string. That's the modem's carriage return character. Every so often, the lack of one causes problems.

Editor's note: After following these suggestions, reader Bob Foiles found several commands in both strings that his modem didn't support. He also found commands that would work only when preceded by a backslash—something that is certainly not standard. By adjusting the strings, he finally got his modem working properly.

Speeding Up Prodigy

Q Prodigy is slow and recently started charging users hourly connect rates. Is there any way that I can speed up access to the service?
Mark Greenfield, Colorado Springs

A Take a look at Pro-Util by Royston Development. This $24.95 pop-up utility may not save you gobs of money, since Prodigy is inherently slow, but it should let you create macros to access Prodigy services a bit faster. Pro-Util also enables you to create E-mail offline or import files from word processors like Word for Windows and WordPerfect, print message screens, and save online data to disk. It includes a built-in address book and a spelling checker for messages composed online. You can set it up to log on and download data in the middle of the night. Even if it doesn't save much money, Pro-Util makes Prodigy more pleasant to use, and it's *very* easy to set up.

You can download Pro-Util from Prodigy by clicking *Jump* at the bottom of the screen, typing **ROYSTON**, and pressing **<Enter>**. Prodigy will bill your credit card account $24.95 plus a $1.75 downloading fee. Or you can order Pro-Util from Royston Development, 4195 Chino Hills Pkwy. #365, Chino Hills, CA 91709, for $24.95 plus $3.50 shipping.

Responsible Investments Online

Q Where online can I find out about mutual funds that are environmentally and politically conscious?
Peter Frankston, Buffalo

A The best place to look first is the Investor's RoundTable on GEnie; simply type **INVEST** from any GEnie prompt. Once you're at the RoundTable, enter **1** to use the Investors' Bulletin Board, enter **SET 5**, and enter **READ 1** for an ongoing discussion of socially conscious mutual funds. Messages go back several years, so you'll find a lot of information.

On CompuServe, take a look at the Investors' Forum (**GO INVFORUM**). The file ENVINV.THD, which is in the Mutual Funds Library, contains a discussion of socially conscious funds. Another file, EI0693.TXT, includes excerpts from a newsletter devoted to tracking the funds of environmentally conscious firms. As we go to press, it's stored in the Investors' Forum's New Uploads library, which means that it will probably be elsewhere by the time you read this. You'll need to run a global search of the libraries to find it.

Once you've identified interesting funds, you can check them out in more detail in the FundWatch database on CompuServe (**GO FUNDWATCH**). Access is free to standard subscribers, and the database contains loads of information.

By Judy Heim

Judy Heim is a contributing editor for PC World *and the editor of* Online Investor, *a newsletter about using online services to track and manage investments.* Communications *welcomes your questions.* *See page 10 for contact information.*

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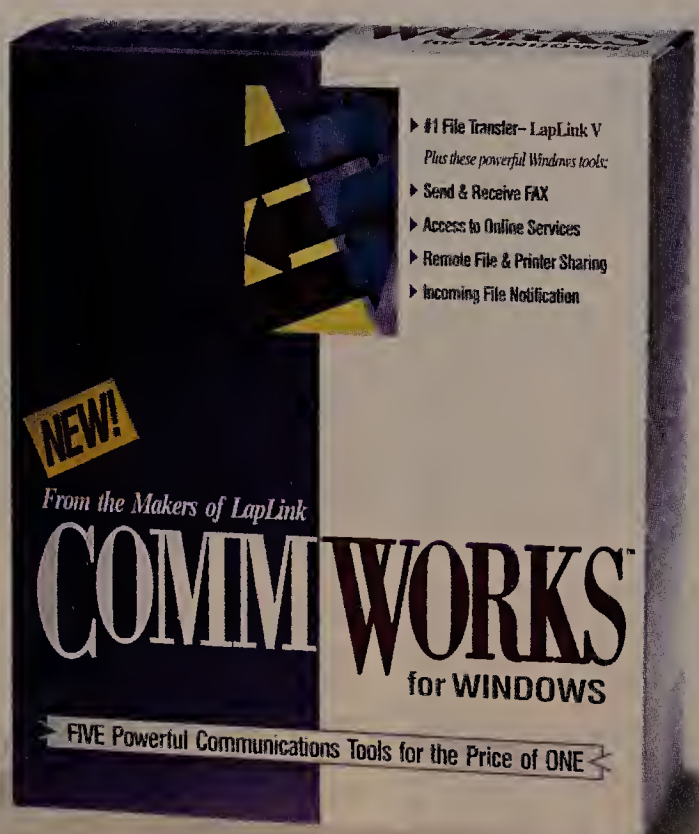

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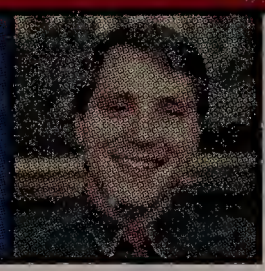

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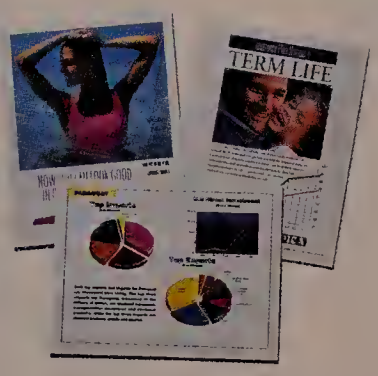

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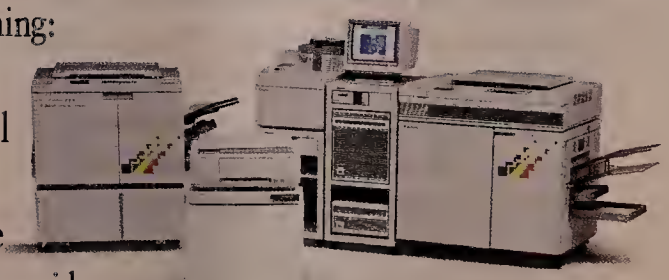

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HARDWARE Q & A

Do-It-Yourself Brain Surgery

Q I have a 286 system I want to upgrade to a 66-MHz 486DX2. I've heard that all I need to do is change the motherboard. Is that true?
Zach T. Friedland,
Brookline, Massachusetts

A Not true at all. To get the performance you desire, you'll need new peripherals that can keep up with your superfast motherboard. So let's cost it out. A 66-MHz 486DX2 motherboard with CPU and 64K of secondary cache should cost $700 or $800. You won't be able to use any of your old 286's memory, so add another $400 for 8MB of RAM—the realistic minimum, assuming you'll be running Windows (if you're considering NT or OS/2, you'll need $400 more to bump up to 16MB).

Now for the peripherals. You'll want a new hard disk that's both fast and big enough to accommodate today's bloated Windows applications. These days I recommend 300MB drives, which commonly cost $500 or $600 with an interface board. A Windows accelerator will tack on $200, and let's add another $75 for a new 1.44MB 3½-inch floppy drive. Finally, depending on its size and quality, a super-VGA monitor costs between $300 and $700, raising the final upgrade price to between $2175 and $3175.

This estimate doesn't take into account the labor—and risk—of replacing a motherboard yourself. Depending on the system, you may have to remove the drive cages and the power supply to get the thing in there, and you'll need to handle the power cables carefully—plugging a power cable into the wrong connector could fry the motherboard instantly. And if you decide to keep any old boards or drives, you run a slight risk that they'll be incompatible with the new motherboard's BIOS.

So why bother? The irony is that you can buy a brand-new 66-MHz DX2 from a reputable vendor, with all the trimmings mentioned above, for between $2500 and $3000. Most vendors also throw in a year's free service and tech support along with a complement of free software. Given that you'd probably spend a day replacing the motherboard on your 286, and that you'd still have an old power supply (replacements cost less than $100, fortunately) and no service contract, I highly recommend you spend the extra couple of hundred bucks and get a new system. You can donate the old 286 to a local school, and whether the new 486DX2 system works or not will be the company's responsibility, not yours.

Slave Drives

Q I want to attach a second IDE hard disk to my system's motherboard. To do this, I'm told, I have to make one hard disk the "master" and the second the "slave." How is this done?
Marcel Renaud, Gaithersburg, Maryland

A It sounds severe, but the idea's pretty simple. Every IDE drive has its controlling electronics on the drive itself. You'll be attaching your drives' built-in controllers to the IDE interface on your motherboard using a single ribbon cable. This results in a fatal conflict, unless you disable one drive's controller to make its drive a slave. (In some cases you'll also have to tell the master drive, whose controller stays active, that a slave drive is present.) On every IDE drive, you'll find at least one jumper block with one or more pairs of pins, each of which may or may not be covered by a tiny plastic-encased jumper. Configuring one of your drives as a master and the other as a slave is easy—it involves only moving a jumper or two on each drive—but you'll need the drive's documentation to show you which jumper does what. If you don't have it, contact the manufacturer's fax-back lines—these offer touch-tone menus from which you can select the appropriate technical documentation and fax it to yourself instantly.

Password: Help!

Q My college roommate and I didn't get along, so I used the password feature on my FastMicro 386/40 to keep him away from my data. I never got documentation with the system. Now I've forgotten the password, and FastMicro is out of business. Is there any way to override the password?
Kevin Skipper,
Lumberton, North Carolina

A Yes, although you'll wipe out your system's configuration information at the same time. To reconstruct that configuration later, you'll need to nose around and write down some specs before you do anything else. First, you need to know how much memory you have. If you don't, shut down your system and turn it back on (or press the reset button if you have one). When your system does its power-on self test (POST), it will tell you how much memory you have before the password prompt appears. Write that figure down.

Next turn off your PC, open it up, and head straight for the hard disk.

USER GROUP TIP

More Power to You

Laptop users understandably worry about battery life. Since a hard disk is a major power drain, anything you can do to reduce disk access will increase work time between recharges. One trick is to create a RAM disk and copy to it, via AUTOEXEC.BAT, any files that your system accesses frequently. If you regularly use a DOS application with overlays, copy that program's directory to the RAM drive and launch it from there. That way when your program needs to read an overlay file or a dictionary, it won't access your hard disk. If you're using Windows and have plenty of RAM—preferably more than 8MB—you might want to add a SET TEMP TO command to AUTOEXEC.BAT to make Windows redirect its TEMP and TMP files to a directory on the RAM drive.

Paul Stephen
Winnipeg PC User Group

Write down the manufacturer's name and the complete model number. Call the hard disk vendor and find out the number of cylinders, the number of heads, the preformatted capacity, the number of sectors per track, the landing zone, and the starting cylinder for write precompensation.

You'll also need to know what kind of floppy drives you have and whether or not you have a math coprocessor. Very likely you have a 5¼-inch 1.2MB drive or a 3½-inch 1.44MB drive or both. If you're uncertain whether you have a coprocessor, look on the motherboard for the CPU, which in your case will be a chip about an inch square labeled "AM386DXL." If you see a slightly smaller chip near the CPU with "387" in its label, you've got a coprocessor. If you see an empty socket, you don't.

Now for the sabotage. Your system's configuration resides in CMOS (Complementary Metal Oxide Semiconductor) RAM, which is powered by a battery, often a small lithium one the size of a nickel located in a socket on the motherboard. Alternatively, your system may have a cluster of standard AA batteries or an oblong cell a couple of inches long wired into the motherboard. Pop out the battery (or unplug its lead from the motherboard) and wait a couple of minutes. Congratulations! You have just destroyed your system configuration, password protection included.

Reconnect the battery, put the cover back on, and turn on your PC. You'll get a message to run your system configuration, along with the keystrokes for calling it up. Do so, and begin entering the correct configuration information for floppy drives, memory, coprocessor, and so on. When you get to hard disk configuration, you'll be prompted for a two-digit hard disk type number. Bring up the hard disk drive table (how you do this varies, but it should be clear enough), and page through it until you find a hard disk type with specs that match the ones you wrote down. Enter the corresponding type number. When you've finished, save the configuration, restart your system—and never forget your password again!

More SCSI Horrors

Q In your September column you explained how to connect different SCSI devices to a single card. Well, it looked good on paper. I bought CorelSCSI, connected a

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MODEL NO. SER-SOUND

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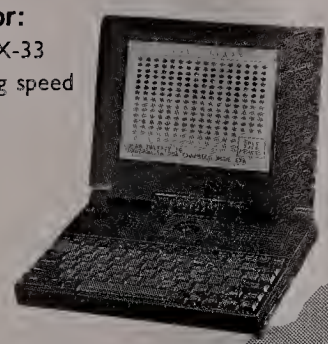
* CPU i80486™DX-33
33MHz operating speed



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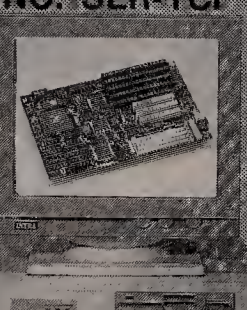

* **CPU:** i80486™DX-33
* **Chipset:** Intel SATURN 82420 PCI chipset
* **Cache Memory:** 256/512KB cache memory
* **Memory:** 4MB on board expandable to 36MB
* **BIOS:** PHOENIX BIOS
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scanner, a hard disk, and an internal CD ROM drive to the same SCSI card and followed your instructions to the letter. It seemed to work at first, but I ran into problems quickly. Sometimes I could access the devices, sometimes I couldn't. I have the latest version of CorelSCSI, and all the devices are supposed to be compatible. Can I have my money back?

Madeline Roville, Sweetwater, Texas

A Sorry, we don't provide that service. But I think I have the solution to your problem. The kind of flakiness you describe often results from a misplaced terminating resistor, a small component that keeps signals from echoing back along the ribbon cable and causing all kinds of errors, including fatal ones.

Be sure there are no terminating resistors on any of the devices except for the last device on each end of the SCSI bus (in this case, *bus* means any series of SCSI devices connected to the same interface card). Usually, the last internal device lies at one end of the bus and the SCSI card at the other (yes, the SCSI card is considered a device). But in your case, an external device—the scanner—is the last device on one end of the bus, while either the CD ROM drive or the hard disk sits on the other end. That means you must remove the terminating resistor from the SCSI card, make sure the scanner has one installed, and check that only the last internal drive connected to the ribbon cable has one. Terminating resistors on internal devices generally look like little combs less than an inch long; on external devices, they're usually plugs stuck into a SCSI connector. Check your manuals to make sure.

If you still have problems, I have a question for you: Where did you get your ribbon cable? Not all SCSI cables are compatible with the SCSI-2 standard, which stipulates specific resistance values. An incompatible cable can wreak as much havoc as a misplaced terminating resistor. If you can't find a local store that will sell you a cable guaranteed to be SCSI-2 compatible, try ordering one from Cables To Go (800/826-7904).

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware Q&A *welcomes your questions (see page 10 for contact information).*

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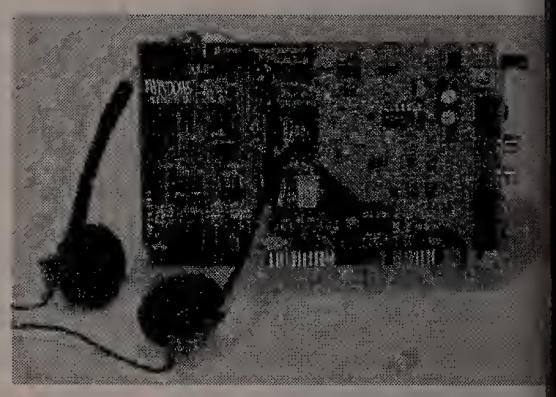

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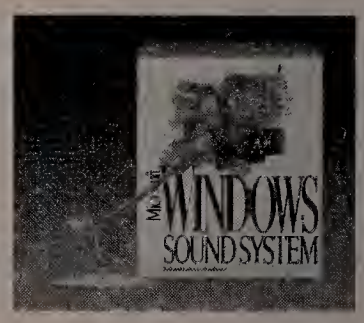

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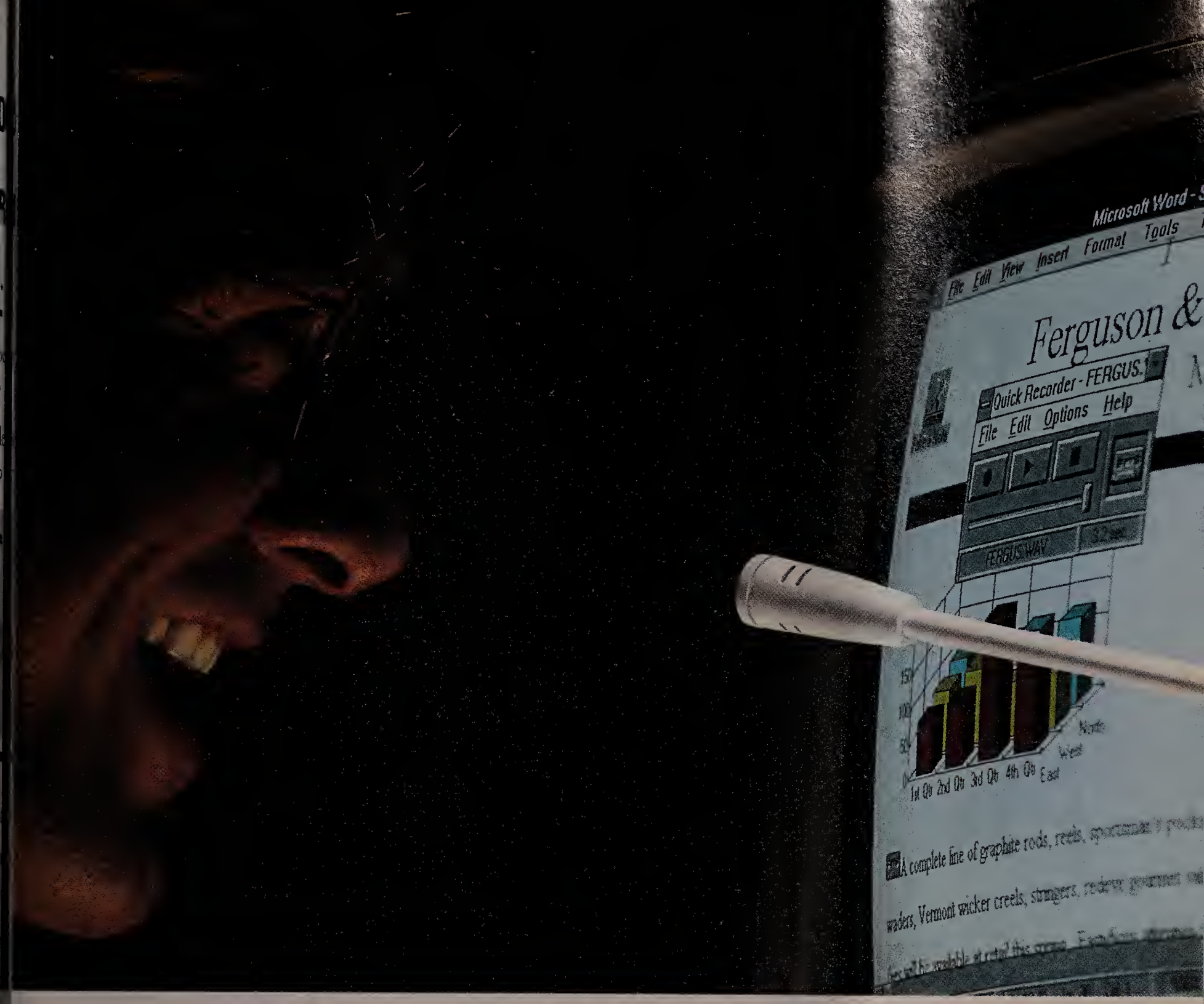

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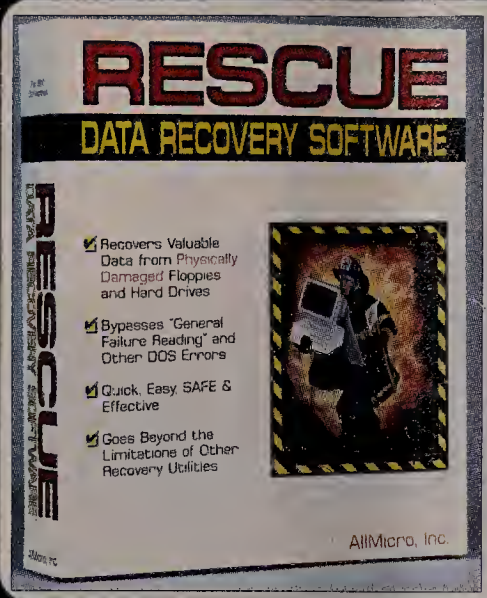

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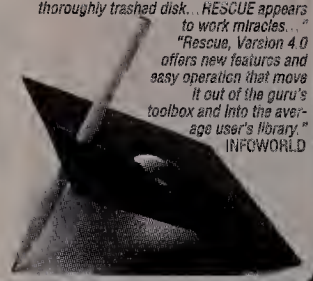

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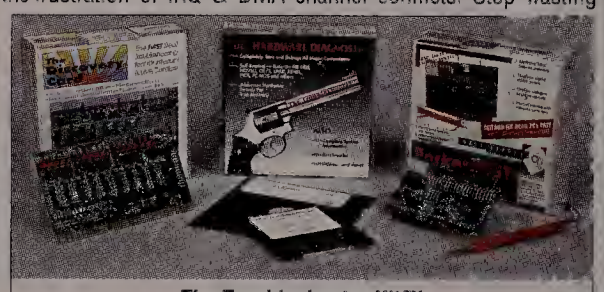
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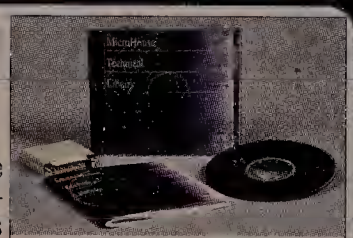
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STAR-DOT-STAR TIPS

DOS 6.0 Anti-Virus: Selecting What You Check

If you suspect that a particular file or directory contains a virus, you might be disappointed to learn that Microsoft Anti-Virus, included with DOS 6.0, will scan only an entire disk drive. This wastes a lot of time if you need to check only a directory. But I've found a way to make MSAV—the Anti-Virus scanner—focus on a single directory. First, use DOS's SUBST command to create a drive letter that's an alias for the directory you want to scan. Then run MSAV on that drive letter. The virus checker will scan that directory plus any of its subdirectories, but not the rest of the disk. Finally, delete the drive letter you created by using SUBST with the /D switch. You can automate the entire process with a batch file like my SCAN.BAT:

```
@ECHO OFF
SUBST D: %1%
MSAV D: /P
SUBST D: /D
```

Gopal Brugalette, Redlands, California

Editor's note: This trick can save a lot of time if a single application is behaving in a strange way and you want to make sure it's not infected with a virus, or if you want to check a program you've just downloaded or installed. Of course, you should be sure to use the virus checker on your entire disk now and then, just in case.

Create SCAN.BAT as an ASCII text file, and save it to a directory in your AUTOEXEC.BAT's PATH statement. If your system already has a D: drive, you'll want to change the three 'D:' references in the batch file to a drive letter that's currently unassigned.

Daylight Saving

Twice a year, you have to reset your PC's clock for daylight saving time. Here's a QBASIC program that, if called daily from AUTOEXEC.BAT, will make these adjustments for you automatically from now until the year 2040 **[FIGURE 1]**.

To use the program, copy the listing to an ASCII text file called **DST.BAS**, and save the file to your C: drive's root directory. Then add the command **QBASIC /RUN C:\DST.BAS** to your AUTOEXEC.BAT file.

The first time DST is run, the program will create a file called DST.DAT in your root directory; thereafter, the program uses this file to see if daylight saving time was in effect the last time the system was booted. The program knows that daylight saving time starts the first Sunday in April and ends the last Sunday in October. If DST detects that daylight saving time has gone into effect—or out of it—since the last time the program booted, it adjusts your system clock accordingly.

Emmett Dulaney, Anderson, Indiana

Editor's note: Before you run this program, make sure that the time on your computer's clock is already correct; otherwise, the program could throw the clock off instead of correcting it. Also, if you leave your computer on 24 hours a day, remember to reboot so that the correction can take place.

If you don't want to clutter your root directory, you can place both DST.BAS and DST.DAT in another directory. Just make sure you include the full path to that directory when you call DST.BAS from AUTOEXEC.BAT and in both references to DST.DAT within the BAS file.

Finally, because this program is written in Microsoft QBASIC, it requires MS-DOS 5.0 or later. DST.BAS is available on PC World Online.

```
a = VAL(LEFT$(DATE$, 2))
b = VAL(MID$(DATE$, 4, 2))
c = VAL(RIGHT$(DATE$, 4))
d = 1992: TZ$ = "in"

DO UNTIL d = c
   d = d + 1: READ e
   LOOP

IF a < 4 THEN TZ$ = "ut"
IF a > 10 THEN TZ$ = "ut"
IF a = 4 THEN
 IF b < e THEN TZ$ = "ut" ELSE TZ$ = "in"
END IF
f = e + 27: IF e > 4 THEN f = e + 20
IF a = 10 THEN
 IF b < f THEN TZ$ = "in" ELSE TZ$ = "ut"
END IF

ON ERROR GOTO 100

OPEN "\DST.DAT" FOR INPUT AS #1

INPUT #1, dst$
g$ = RIGHT$(dst$, 2): CLOSE
IF g$ = TZ$ THEN SYSTEM
h = VAL(LEFT$(TIME$, 2))
IF TZ$ = "in" THEN h = h + 1 ELSE h = h - 1
i$ = STR$(h) + RIGHT$(TIME$, 6):  i$ = LTRIM$(i$)
TIME$ = i$

100 IF TZ$ = "ut" THEN TZ$ = "out"
OPEN "\DST.DAT" FOR OUTPUT AS #1
PRINT #1, "Daylight Saving Time is "; TZ$
CLOSE : SYSTEM

DATA 4,3,2,7,6,5,4,2,1,7,6,4,3,2,1,6,5,4,3,1,7,6,5,3
DATA 2,1,7,5,4,3,2,7,6,5,4,2,1,7,6,4,3,2,1,6,5,4,3,1
```

FIGURE 1: DAYLIGHT SAVING TIME adjustments are automatic when you put this QBASIC program in your AUTOEXEC.BAT file.

Incredible Shrinking Wallpaper

Normally, the image Windows displays in the background as wallpaper must come from a bit-map file with the extension BMP. But since BMP files don't incorporate image compression, even a small collection of screen-size, 256-color images can take up mega-

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bytes of space. Fortunately, I've discovered an undocumented feature that solves this problem: Windows will accept RLE (run-length-encoded) files—which are compressed—as wallpaper. Simply convert your wallpaper files from BMP to the RLE format, then change the extension on the new RLE files back to **BMP** so that they'll appear on the list of available files when you select your wallpaper. When Windows opens your wallpaper file, it will automatically detect that the file is compressed and display it properly.

Vinay Mehta, Lennoxville, Montreal, Quebec

Editor's note: Converting your BMP files to the RLE format is a good idea in general, since it saves space and can make them load faster. To perform the conversion, you'll need to use a third-party product such as Inset Systems' HiJaak or Halcyon Software's DoDOT, since Paintbrush doesn't support the RLE format. One shareware program that can make the conversion, Paint Shop Pro, is available on PC World Online.

Auditing as Easy as 1-2-3

Businesses often need to keep audit trails showing when and how often employees update a worksheet. Here's a 1-2-3 macro [**FIGURE 2**] that will post an entry to a log every time the worksheet with the macro is opened. You can track multiple worksheets in the same log file, since the macro records the worksheet's name along with the time and date it was opened. This macro works with 1-2-3 versions 2.1 and later, as well as spreadsheets that support 1-2-3 macros.

Since the macro is named \0, it will execute every time the worksheet is opened. If your worksheet has an auto-execute macro, add a {BRANCH *location*} command at the end of this macro to jump into it.

Bob Mick, Chicago

Editor's note: Some companies buy costly, complex auditing packages to tell them who opens which worksheet when; while this free macro can't do everything those programs can, it may do all that you need.

As always, enter this macro in an out-of-the-way place in your worksheet. Remember to precede every label that begins with a slash (/ or \) with an apostrophe. In other words, type the first cell entry as **'\0**. When you enter the text '@NOW' into the macro, a number will appear on your worksheet; don't worry, that's supposed to happen. Also, be sure to replace the file name FILENAME.WK1 on the bottom line of the macro with the name of your worksheet file. Once you've entered the macro, use */Range•Name•Labels•Right* to assign the names in the left-hand column to the cells to their right. After this is done, the macro will run automatically when the worksheet is opened. This macro is available as AUDIT.WK1 in the Featured in December folder on PC World Online.

One warning: If you copy an audited worksheet, make sure to change the file name within the macro. Otherwise, you won't be able to distinguish changes in the copy from changes in the original.

The World's Cheapest Sound Card

Even if you don't have a sound board, you can take advantage of Windows 3.1's sound capabilities. Microsoft has a sound driver for the PC speaker, and although this driver

	A	B	C
1	\0	{OPEN LOG_FILE,a}{OPEN LOG_FILE,w}	//Open for write or append
2		{CONTENTS DATER2,DATER,10,114}	//Format date
3		{CONTENTS TIMER,DATER,10,123}	//Format time
4		{calc}	
5		{WRITELN REVISE&DATER2&TIMER}	//Write to file
6		{close}	//Close file
7			
8	DATER	@NOW	//Current date/time
9	DATER2		//Formatted date
10	TIMER		//Formatted time
11	LOG_FILE	C:\123\123.LOG	//File name
12	REVISE	FILENAME.WK1 REVISED	//Caption (trailing space)

FIGURE 2: TO AUDIT YOUR WORKSHEET, use this handy 1-2-3 macro.

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lulti-Store/Warehouse	Y	N	N	N	N
roduct Assembly	Y	N	N	Y	N
lulti-Currency	Y	N	N	N	N
roject Cost Control	Y	N	Y	N	N
ɔb Costing	Y	N	N	N	Y
ırder Entry	Y	N	N	Extra $	Y
uditing	Y	Y	N	N	N
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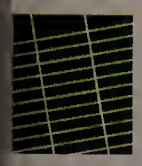

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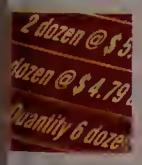

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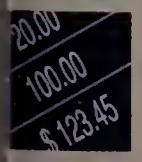

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USER GROUP TIP

Warding off Errant Immunizations

After using Central Point Anti-Virus's immunization feature to give your program files their own virus protection, you may sometimes find that a program won't run properly. It seems that some EXE, COM, and OVL files are incompatible with the changes Anti-Virus makes. The solution is easy: Remove the immunization by selecting the misbehaving file, then selecting *Scan • Remove Immunization*. You may also want to use *Configure • Immunization Exceptions* to tell Anti-Virus not to immunize that file in the future.

Neil Longmiur
Winnipeg PC User Group

isn't included with Windows, it is available for free. You can download the driver from the Microsoft Product Support Download Service, a BBS that can be reached at 206/936-6735. Set your communications software to 1200 to 9600 baud, with no parity, 8 data bits, and 1 stop bit. Follow the on-screen directions to download the file **SPEAK.EXE** (pretty standard stuff for a BBS).

SPEAK.EXE is a self-extracting archive file that produces the driver and supporting files when you run it. Windows normally expects you to load drivers from floppy disks, so it's best to do just that. Insert an empty, formatted floppy disk into the A: or B: drive, then at the DOS prompt, log on to that drive and run SPEAK.EXE from whatever directory it's in (for example, if you downloaded the file to C:\TEMP, enter **C:\TEMP\SPEAK**). This will copy the driver files to the floppy disk you're logged on to.

Inside Windows, launch Control Panel and double-click the *Drivers* icon. Click the *Add* button, and select *Unlisted or updated driver* from the list that appears. Identify the floppy drive the driver is on and click *OK*. In the next dialog box, click *OK* to install 'Sound Driver for PC-Speaker'.

During installation the driver will automatically test the speed of your system to determine the appropriate playback rate, then bring up a setup dialog box. I recom-

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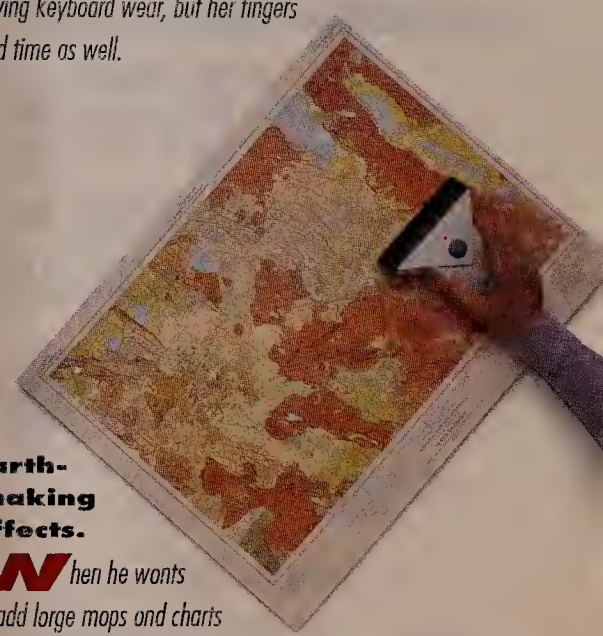
Peakdesign of Oakland uses Logitech's ScanMan to create customized icons for user-friendly interfaces on proprietary systems. The end product looks tailor made, and the clients look impressed.



Earth-shaking effects.

When he wants to add large maps and charts to the textbook he's writing, California geophysicist Rick Blakely uses Logitech's ScanMan with AutoStitch to lace together individual scans. It makes his data more moving.

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mend that you make the following changes.

First, increase the 'Seconds to limit playback' to 'No Limit'. This allows you to play back a sound file that's as big as your hard disk. Microsoft designed the driver to limit playback because the driver stops all other applications from running while it's playing back sound. Fortunately, the WAV files included with Windows 3.1 are fairly small, so this should not be a problem.

Second, for the highest-quality sound, increase the volume to the maximum—10.00. If that's too loud, you can use the Sound Recorder to decrease the WAV files' volume; you can also change their speed, add an echo, or make the sound file play backward. Unfortunately, you can't record sound, as you can with a real sound card.

After you've finished with your settings and restarted Windows, you may want to launch Control Panel's *Sound* icon to associate sound files with system events, such as Windows Start, Windows Exit, Default Beep, and so on. Before long, you'll be looking for collections of recorded WAV files to add to your system. The best sources are BBS's, CD ROMs, and commercial software packages.

Evan R. Morris, Vancouver, Washington

Editor's note: The Microsoft Speaker Driver turns a few chips on your motherboard into the world's cheapest sound card—a great way to go if you need sound on your PC only occasionally. But Microsoft had reasons for not including it with Windows.

First, whenever you substitute software for hardware, you're likely to hurt system performance. This driver could make your system run sluggishly at times, and you may have to turn it off completely to run programs such as terminal emulators that need to respond quickly to external events. Also note that this driver won't play all WAV files, since Microsoft hasn't updated the driver to handle new extensions to the WAV file format, such as compression. But it will handle most of the WAV files you'll find posted on BBS's. In addition to accessing Microsoft's BBS, you can also download SPEAK.EXE from PC World Online.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs.* *See page 10 for contact information.*

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MICROSOFT WORD 6.0 FOR WINDOWS

Microsoft Word 6.0 for Windows' interface consists of a menu bar, Formatting tool bar, Standard tool bar, ruler, and status bar. The Formatting tool bar, formerly the Ribbon, holds drop-down list boxes and buttons for changing the viewing and formatting of text. The Standard tool bar holds buttons for common WinWord tasks. Different tool bars appear according to your actions. You can display or hide tool bars, change their location, create your own, and edit any tool bar. Place the pointer over a button, and after a short pause, WinWord displays its function.

Choose a command by opening a menu and pressing the command's underlined letter, by clicking buttons, or by using <Alt>-, <Shift>-, and <Ctrl>-key combinations. Right-click a tool bar, text, a table, a graphic, a bulleted list, a frame, or another object to open a context-sensitive shortcut menu.

Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, check box, and list names in a series.

CUSTOMIZING THE DISPLAY

Display document in normal/outline/page layout/master document view	**V**iew • **N**ormal/**O**utline/**P**age Layout/**M**aster Document
Show document without title, menu, and tool bars	**V**iew • **F**ull Screen
Show/hide tool bar(s)	**V**iew • **T**oolbars, select tool bar, OK
Show/hide ruler	**V**iew • **R**uler
Magnify/shrink view of document	200% or **V**iew • **Z**oom, select or set percentage, OK
Show/hide status bar	**T**ools • **O**ptions • **V**iew • Status **B**ar
Show/hide nonprinting characters	¶ or **<Ctrl>-<Shift>-8**
Show/hide headers and footers	**V**iew • **H**eader and Footer
Show/hide horizontal/vertical scroll bars	**T**ools • **O**ptions • View • Horizontal Scroll Bar/**V**ertical Scroll Bar
Move tool bar to top/bottom/sides of screen or to floating window	Point to empty area on tool bar and drag to new location

MOVING AND SELECTING TEXT

WinWord's flashing cursor, or insertion point, indicates your current position—where text will appear when you type. Move the cursor by clicking the desired destination or by using keyboard commands. Select text, table cells, pictures, and other objects by dragging the mouse pointer over them or by holding **<Shift>** and using keyboard commands to move the cursor.

Move to beginning/end of word	**<Ctrl>-<Left>/<Ctrl>-<Right>**
Move to beginning/end of paragraph	**<Ctrl>-<Up>/<Ctrl>-<Down>**
Move to beginning/end of line	**<Home>/<End>**
Move up/down one screen	**<Page Up>/<Page Down>**
Move to beginning/end of document	**<Ctrl>-<Home>/<Ctrl>-<End>**
Select word	**<F8><F8>** or double-click word
Select sentence	**<F8><F8><F8>** or **<Ctrl>**-click sentence
Select paragraph	**<F8><F8><F8><F8>** or triple-click paragraph
Select single line of text	Click in line's left margin
Select contiguous lines of text	Click first/last line's left margin and drag down/up
Select vertical text block	Hold **<Alt>** and drag
Select document except headers, footers, annotations, footnotes, and endnotes	Triple-click in left margin or **<Ctrl>-A** or **E**dit • Select All
Select document	Click in document window, **<Ctrl>-<NumPad 5>**

EDITING TEXT

Cut selection to clipboard	or **<Ctrl>-X** or **E**dit • Cut
Copy selection to clipboard	or **<Ctrl>-C** or **E**dit • **C**opy
Paste from clipboard	or **<Ctrl>-V** or **E**dit • **P**aste
Move selection	Drag to destination or cut and paste
Copy selection	Hold **<Ctrl>**, drag to destination; or copy and paste
Delete selection	**<Delete>** or **E**dit • Clear
Delete character left/right of cursor	**<Backspace>/<Delete>**
Delete from cursor to begining/end of word	**<Ctrl>-<Backspace>/<Ctrl>-<Delete>**
Restore deleted selection	or **<Ctrl>-Z** or **E**dit • **U**ndo
Create boilerplate text	Select text, , type new name if you want, **A**dd
Insert boilerplate text	Type boilerplate text's name, or **<F3>** or **<Ctrl>-<Alt>-V**

FORMATTING AND STYLING TEXT

Formatting affects the current word if nothing is selected. A style is a set of formats, making it easy to apply consistent formats.

Copy selection's format to other text	, select target; or **<Ctrl>-<Shift>-C**, select target, **<Ctrl>-<Shift>-V**
Format document automatically	or **F**ormat • **A**utoFormat, OK, **A**ccept
Change selection's column format (or document's, if nothing selected)	or **F**ormat • **C**olumns; select preset, OK
Apply left/center/right alignment or full justification to current paragraph	or **<Ctrl>-L**/ or **<Ctrl>-E**/ or **<Ctrl>-R**/ or **<Ctrl>-J**
Decrease/increase paragraph's left indent	or **<Ctrl>-M**/ or **<Ctrl>-<Shift>-M**
Increase/decrease hanging indent	**<Ctrl>-T/<Ctrl>-<Shift>-T**
Apply/remove boldface	**B** or **<Ctrl>-B**
Apply/remove italics	*I* or **<Ctrl>-I**
Apply/remove underlining	U or **<Ctrl>-U**
Apply/remove superscript/subscript	**F**ormat • **F**ont • Superscript/Subscript
Set selection's font	Times New Roman or **<Ctrl>-<Shift>-F**
Set selection's font size	10 or **<Ctrl>-<Shift>-P**
Set current paragraph's left/right margins	; or **F**ile • Page Set**U**p • **M**argins, set margins, OK
Add current paragraph's left/center/right/decimal tab(s)	Click button on ruler's left end to show , , , or . Click ruler to set tab.
Single-/1.5-/double-space current paragraph	**F**ormat • **P**aragraph • **I**ndents and Spacing, select spacing, OK; or **<Ctrl>-1/<Ctrl>-5/<Ctrl>-2**
Start bulleted list	or **F**ormat • Bullets and **N**umbering • **B**ulleted; select style, OK
Start numbered list	or **F**ormat • Bullets and **N**umbering • **N**umbered; select style, OK
Start multilevel list	**F**ormat • Bullets and **N**umbering • **M**ultilevel, select style, OK
Remove formatting	**<Ctrl>-<Space>**

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MICROSOFT WORD 6.0 FOR WINDOWS

FORMATTING AND STYLING TEXT (continued)

Add border to current or selected paragraph	or **F**ormat • **B**orders and Shading • **B**orders, select border(s) and style, OK
Change selection to lowercase, initial cap, or uppercase	**<Shift>-<F3>** until desired case reached
Create new style	**F**ormat • **S**tyle • **N**ew, type name, select style type and basis (if any), **F**ormat, set formats, OK • Close
Apply style to selection	Select style from Normal or **F**ormat • **S**tyle, select style, **A**pply
Apply Normal style	**<Ctrl>-<Shift>-N**

OUTLINING

Changing to Outline View (**V**iew • **O**utline) displays the Outlining Toolbar. An outline may have eight levels of headings, with body text below each heading.

Set numbering style	**F**ormat/**H**eading Numbering, select style, OK
Promote/demote current heading or change body text into heading	or **<Alt>-<Shift>-<Left>**/ or **<Alt>-<Shift>-<Right>**
Move current heading up/down one level	or **<Alt>-<Shift>-<Up>**/ or **<Alt>-<Shift>-<Down>**
Change current heading to body text	or **<Alt>-<Shift>-<NumPad 5>**
Expand body text under current heading	or **<Alt>-<Shift>-<Plus>**
Collapse body text under current heading	or **<Alt>-<Shift>-<Minus>**
Display first *n* heading levels	1 ... 8 or **<Alt>-<Shift>**-*n*
Show/hide body text	or **<Alt>-<Shift>-A** or **<Gray Asterisk>**
Display body text paragraphs' first lines/full text	or **<Alt>-<Shift>-L**
Show/hide outline's character formatting	or **<Gray Slash>**
View/hide master document	or **V**iew • **M**aster Document

WORKING WITH FILES

Create new file	or **<Ctrl>-N** or **F**ile • **N**ew
Open existing file	or **<Ctrl>-O** or **F**ile • **O**pen
Save open file	or **<Ctrl>-S** or **F**ile • **S**ave
Save open file to other name/directory/format	**<F12>** or **F**ile • Save **A**s, type new name and/or select other options, OK
Print file	or **<Ctrl>-P** or **F**ile • **P**rint
Preview printout on screen	or **F**ile • Print Preview
Open new file window	**W**indow • **N**ew Window
Go to open file window	**<Ctrl>-<F6>** or **W**indow • **1**/**2**/.../*n*
Set default font/font size	**F**ormat • **F**ont, select font/font size, **D**efault, **Y**es

WORKING WITH MACROS

Record macro and assign to tool bar/menu/keyboard	**T**ools • **M**acro, type name, Rec**o**rd, assign macro, perform actions, **T**ools • **M**acro • Stop Rec**o**rding
Type macro	**T**ools • **M**acro, type name, Cr**e**ate, type macro
Run macro	**T**ools • **M**acro, select macro, **R**un
Edit macro	**T**ools • **M**acro, select macro, **E**dit, make changes

WORKING WITH TABLES

Insert table at insertion point	or **T**able • **I**nsert Table, set number of rows and columns, OK
Convert selected tabular/parallel text columns to table	or **T**able • **C**onvert Text to Table
Convert selected row(s) to text	**T**able • **C**onvert Table To Text, select separator, OK
Select cell	Click left margin inside cell
Select adjacent cells	Drag across cells
Select row(s)	Click left of first cell, drag down/up
Select column(s)	**<Alt>**-click column, drag right/left
Select entire table	**<Alt>-<NumPad 5>** or **T**able • Select **T**able
Insert rows/columns above/left of selection	or **T**able • **I**nsert Rows/Columns
Merge row's cells	Select cells, **T**able • **M**erge Cells
Delete selected row(s)/column(s)	**T**able • **D**elete Rows/Columns
Set selected row's/column's height/width	**T**able • Cell Height and **W**idth • **R**ow/ **C**olumn, select height/width, OK

WORKING WITH GRAPHICS

Show/hide Drawing tool bar	or **V**iew • **T**oolbars • Drawing
Insert new Microsoft Graph chart object	; or **I**nsert • **O**bject • **C**reate New • Microsoft Graph, create chart, OK
Insert new Excel worksheet object	; or **I**nsert • **O**bject • **C**reate New • Microsoft Excel Worksheet, create worksheet, OK
Insert other type of new graphic object	**I**nsert • **O**bject • **C**reate New, double-click type
Insert existing graphic object	**I**nsert • **O**bject • Create from **F**ile, double-click type
Insert existing picture object	**I**nsert • **P**icture, double-click file
Select object	Click object
Edit object	Double-click object
Size/move object	Select object, drag handle/center
Size graphic object proportionally	Select graphic, **<Shift>**-drag corner

USING TOOLS

Check spelling of selection or document	or **<F7>** or **T**ools • **S**pelling
Check grammar of selection or document	**T**ools • **G**rammar
Replace selected word with synonym	**<Shift>-<F7>** or **T**ools • **T**hesaurus; select meaning, select word, **R**eplace
Search for text	**E**dit • **F**ind, type text to find, **F**ind Next
Search and replace text	**E**dit • **R**eplace, type text to find, type new text, **R**eplace/Replace **A**ll
Undo last action	or **<Ctrl>-Z** or **E**dit • **U**ndo
Redo last action	or **<F4>** or **E**dit • **R**epeat
Count pages, words, characters, paragraphs, lines	**T**ools • **W**ord Count
Enable/disable automatic spelling corrector	**T**ools • **A**utoCorrect • Replace **T**ext as You Type

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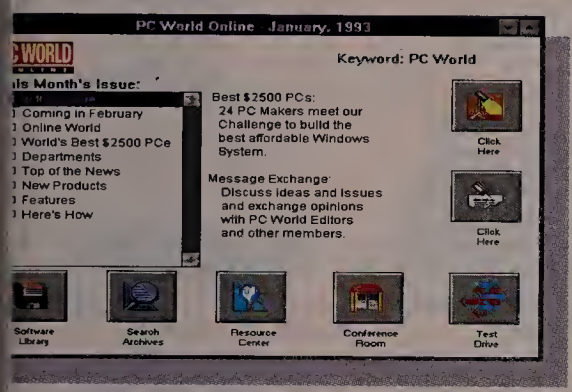

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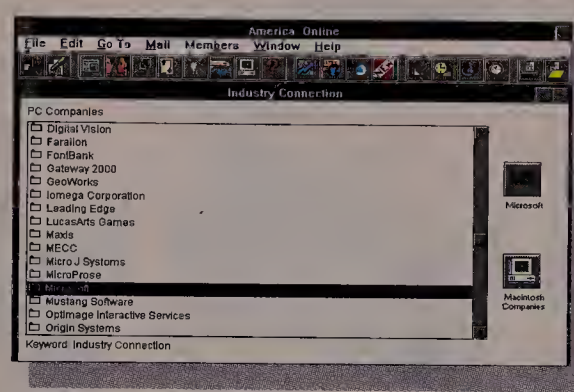

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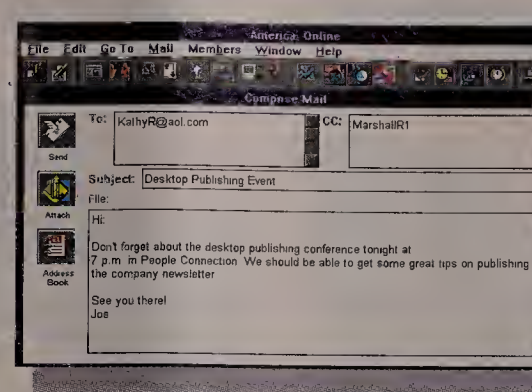

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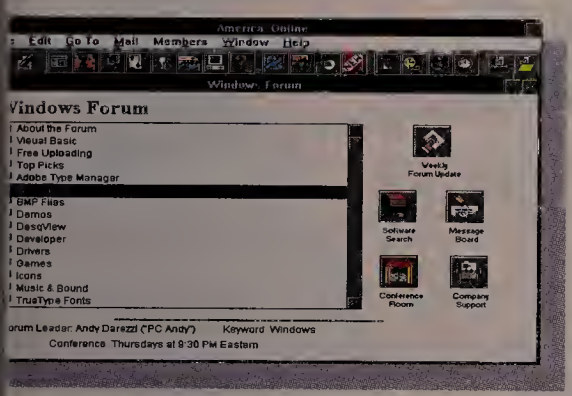

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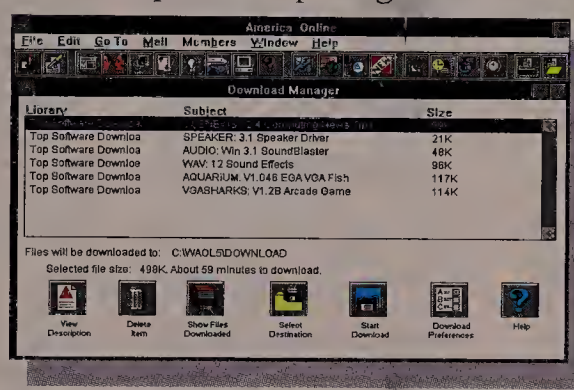

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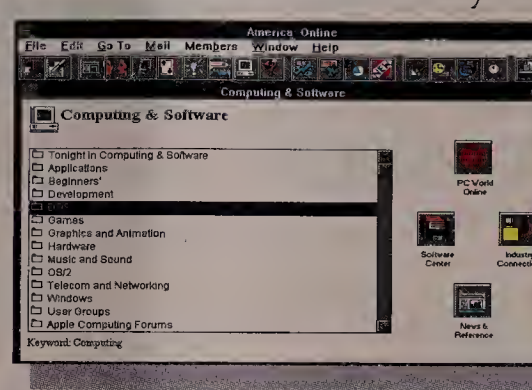

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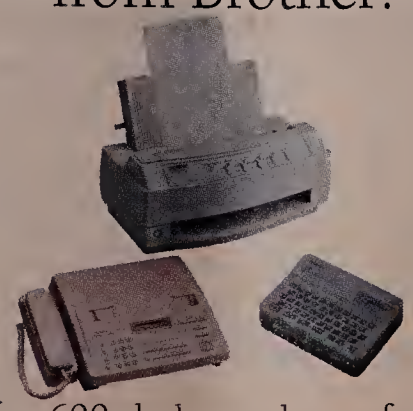

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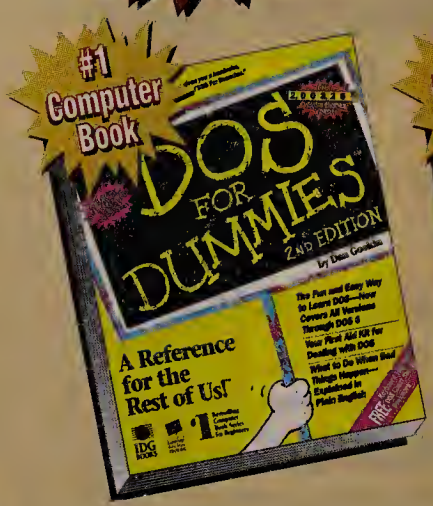

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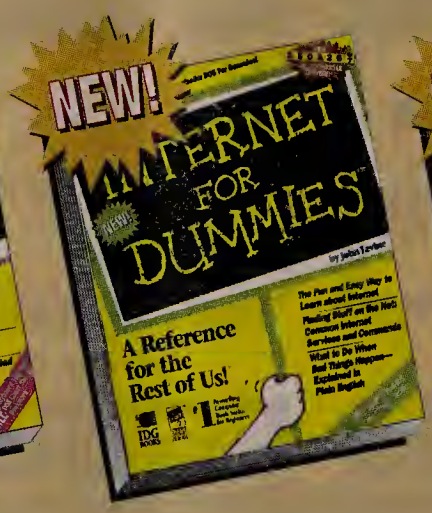

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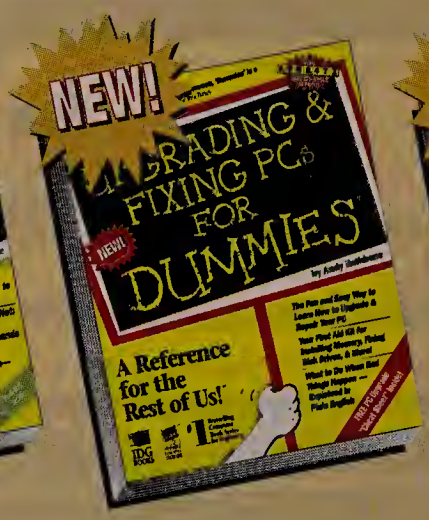

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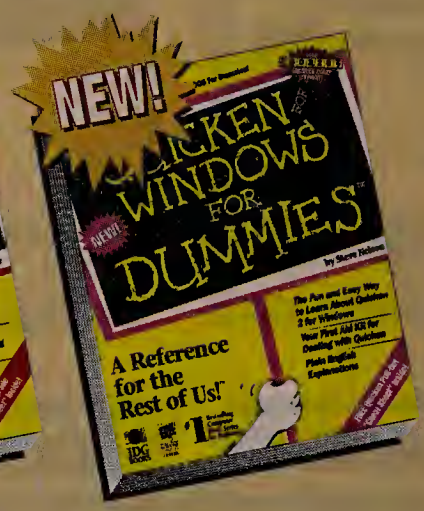

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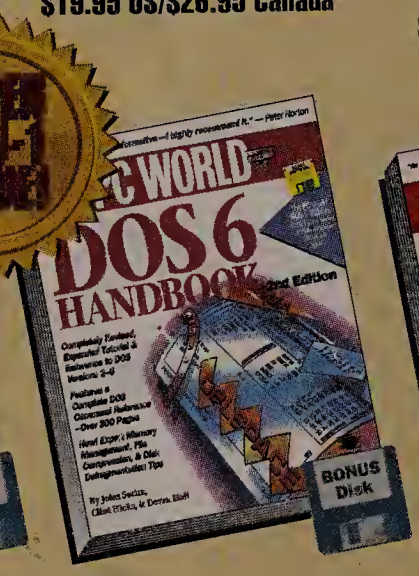

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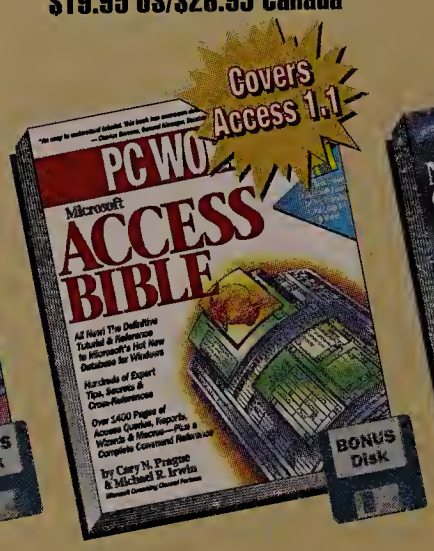

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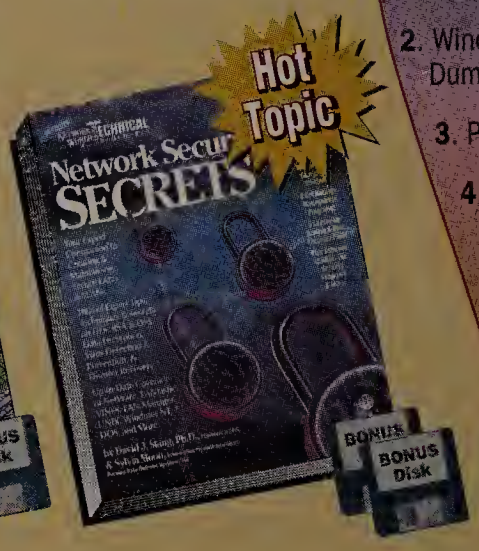

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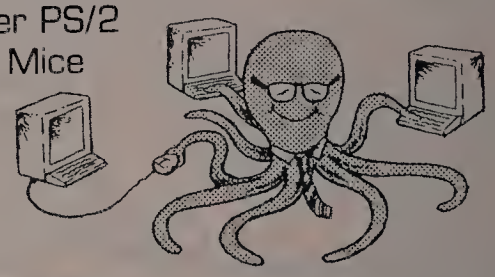

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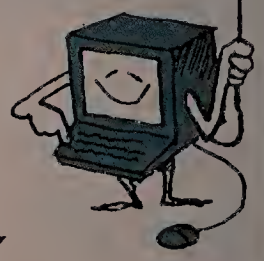

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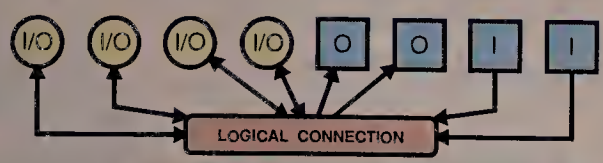

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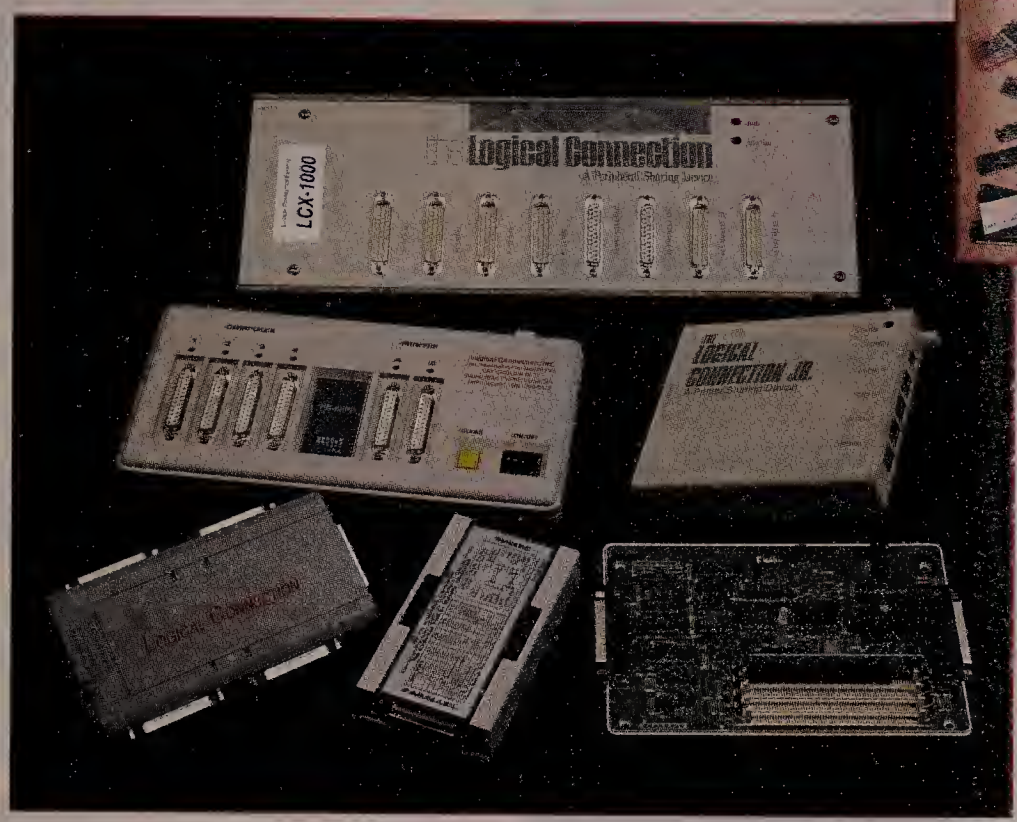

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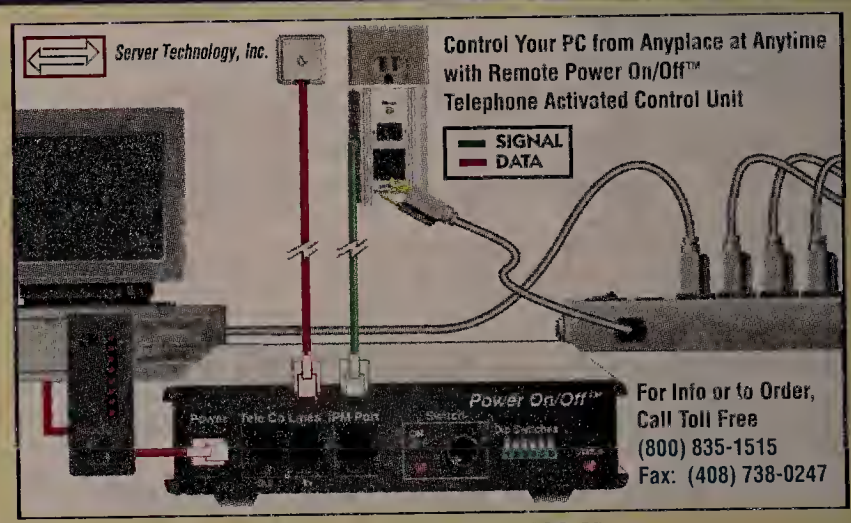

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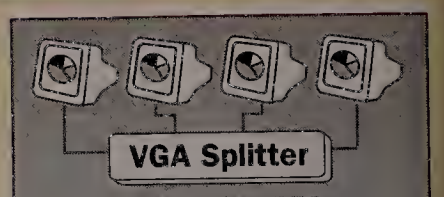

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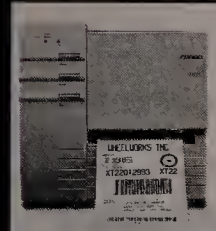

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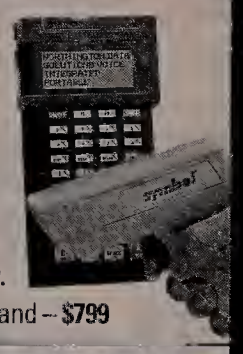

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6450379 (2Meg)	80-111, 311-121, 321, 081, 161	69.00
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DeskPro 386/20E	1Meg Exp Bd	113644-001	149.00
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LTE LITE/20, 25, 25C	8Meg Module	129769-003	419.00
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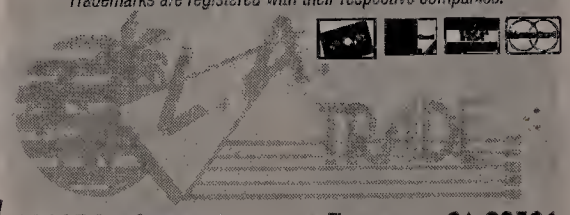

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ALR Venture	4Meg	12407990	279.00
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	209.00
AST Power Exec 3/25C, 425EL	4Meg		229.00
AST Power Exec 3/25C, 425EL	16Meg		1049.00
AST Power Exec 425SL	4Meg	501166-001	239.00
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AT&T Safari NSX/20	4Meg	PEC 37651	299.00
Bondwell B310, Plus	1Meg	23050-09100	109.00
Bondwell B310V, SX	1Meg		109.00
Bondwell B310CV, SX	4Meg		229.00
Epson NB3	4Meg	A808511	219.00
Epson NB/SL 20,25,25C	2Meg	A808771	119.00
	4Meg	A808781	219.00
	8Meg		479.00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	109.00
Everex Tempo Carrier	2Meg	PWA 0884-A-J000	119.00
Goldstar GS520 386SX/16	4Meg	S386-4M	299.00
Magnavox Metalis	1Meg, 4Meg	286, 386SX	119.00,219.00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	79.00
NEC Prospeed 286, 386SX-16	4Meg	PC21-22	219.00
NEC Prospeed 386	2Meg	PC31-21	119.00
NEC Prospeed 386	8Meg	PC31-22	439.00
NEC Prospeed 386SX-20	1Meg	PC43-21	79.00
NEC Prospeed 386SX-20	4Meg	PC43-22	219.00
NEC Ultralite III/20, 20P, 25C	2Meg	PC47-21	119.00
NEC Ultralite III/SL/25C	4Meg	PC47-22	219.00
NEC Ultralite SL/20, 20P	6Meg	PC49-21	319.00
NEC Ultralite III/25C	8Meg	PC47-23	439.00
NEC Ultralite Versa	4 Meg/8Meg/16Meg	OP4104	299/499/1799
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	119.00,219.00
Panasonic CF170, CF270, CF370	1Meg	CF-BA165	49.00
Sanyo 17/18 N8	2Meg	M8C-NBMEM2	109.00
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Sharp PC-6220	1Meg	CE 621B	79.00
Tandon, PC Brand, Dataworld	2Meg, 8Meg	NB386SX-20	129.00, 449.00
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Zenith Master Sport 386SX	2Meg	ZA-300-1	129.00
Zenith Master Sport SL, SLE	2Meg	ZA-4-4	129.00
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Epson 6000, Action Laser	–	–	–	125	–	–	209	–	–	–	–	–
Epson Action Laser II	–	–	89	–	199	–	–	305	–	–	–	–
Epson 8000	–	–	89	–	199	–	–	305	–	–	–	–
Epson 1000	–	–	–	108	–	–	216	–	324	–	–	–
HP 2, 2D–	–	–	–	119	–	–	199	–	–	–	–	–
HP 3, 3D, 3P, 2P 2P+	–	–	–	109	–	–	189	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	89	–	–	195	–	–	399	–	–
HP 4L	–	–	59	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	69	–	–	–	199	–	–	399	–	–
HP 4SI	–	–	–	69	–	–	199	–	–	399	–	–
HP Deskjet 500, 500C, 550	–	59	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	89	–	–	199	–	–	399	–	–
HP Paintjet XL300	109	–	–	–	–	–	304	–	–	499	907	–
IBM Laser 4019, 4019E	–	–	–	–	–	169	–	–	–	–	–	–
IBM Laser 4029	–	–	–	–	–	–	199	–	–	–	–	–
IBM Laser 4039	–	–	–	99	–	–	199	–	–	389	–	–
NEC 90, 290	–	–	–	139	–	–	–	–	–	–	–	–
NEC 95	–	–	–	99	–	–	–	–	–	–	–	–
Oki 400	–	–	–	95	–	–	–	–	–	–	–	–
Oki 400 E	–	–	135	189	–	–	–	–	–	–	–	–
Oki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
Packard Bell PB 9500	–	–	–	124	–	–	209	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	129	–	–	209	–	–	–	–	–
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–	–
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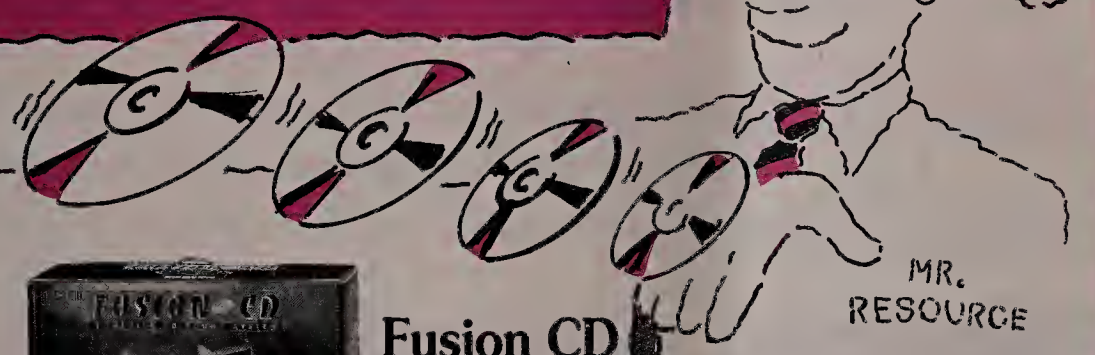

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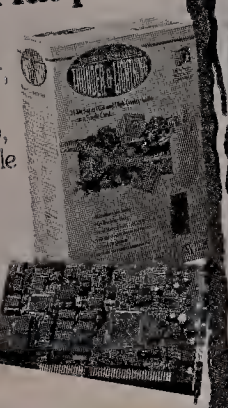

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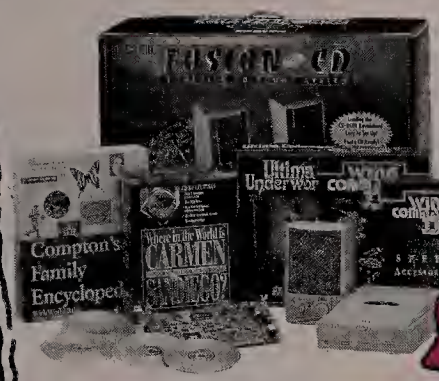

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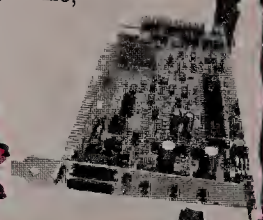

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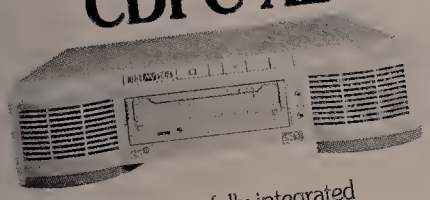

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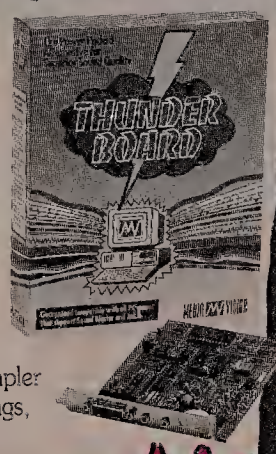

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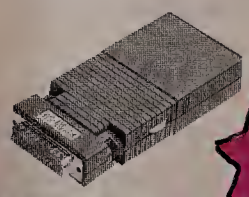

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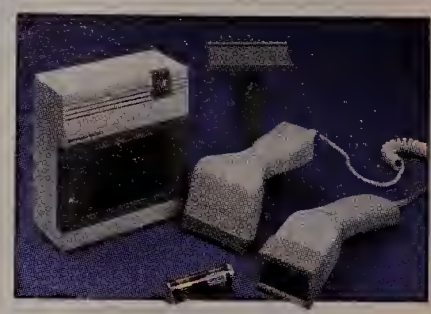

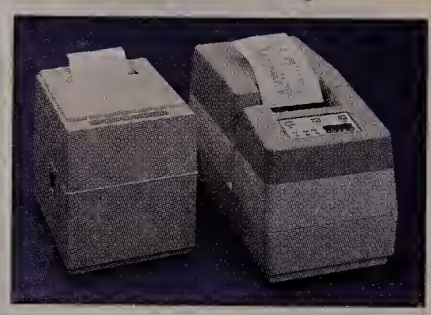

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1.2GB ST11200N SCSI-2	10MS	3.5"	929
1.2GB ST41200N	14MS	FH	995
1.6GB ELITE-I	11MS	FH	1689
1.6GB ST41651	15MS	FH	1279
2.1GB ST42100N SCSI-2	14MS	FH	1429
2.1GB ST42400 SCSI-2	11MS	FH	1769
3.55GB ST43400N SCSI-2	10MS	FH	2279
2.4GB ELITE-II	11MS	FH	1695
1.7GB BARRACUDA-I ST11950N SCSI-2	3.5"		1799
2.1GB BARRACUDA-II ST12550N SCSI-2	3.5"		2299
2.2GB ST12400N SCSI-2	12MS	3.5"	1999

WESTERN DIGITAL

FACTORY NEW – 2 YEAR WARRANTY

IDE			
212MB WD2200	12MS	3.5X1"	$205
250MB WD2250	14MS	3.5X1"	229
340MB WD2340	12MS	3.5X1"	295
420MB AC2420	13MS	3.5X1"	429

CONNER

FACTORY NEW – 1 YEAR WARRANTY

IDE			
85MB CP30084E	17MS	3.5X1"	$154
120MB CP30104H	19MS	3.5X1"	159
170MB CP30174E	17MS	3.5X1"	175
212MB CP30204	12MS	3.5X1"	299
250MB CP30254H	14MS	3.5"	219
340MB CP30344	14MS	3.5X1"	299
540MB CP30544	10MS	3.5X1"	595
SCSI			
85MB CP30080E	17MS	3.5X1"	171
170MB CP30170E	17MS	3.5X1"	204
212MB CP30200	12MS	3.5X1"	279
540MB CP3540 SCSI-2	10MS	3.5"	595
1.3GB CP31370 SCSI-2	10MS	3.5"	1015

HEWLETT PACKARD

FACTORY NEW – 5 YEAR WARRANTY

CAPACITY M/N	SPEED	SIZE	PRICE
SCSI			
1.0GB C2247	10MS	3.5"	$1045
1.0GB C97558	13MS	FH	1395
1.3GB C3009	11.5MS	FH	1995
2.0GB C3010	11.5MS	FH	2295
2.1GB C2490	8.9MS	3.5"	2245

digital

DISK DRIVES FOR POWER USERS

IDE			
1.0GB 3105S	9.5MS	3.5"	$1185
1.5GB 3150S	9.5MS	3.5"	1395
2.0GB 3200S	12.5MS	FH	1695
3.1GB 3350S	11.5MS	FH	2995

SAMSUNG

IDE			
120MB 3062	17MS	3.5X1'	165
250MB 3125	15MS	3.5X1"	235

DYNAMIC RAMS

1MB X 1-100NS	CALL!
1MB X 1-80NS	CALL!
1MB X 1-70NS	CALL!
1MB X 1-60NS	CALL!
256K X 1-150NS	CALL!
256K X 1-120NS	CALL!
256K X 1-100NS	CALL!
1 x 4-80NS DIPP	CALL!
256 X 1-80NS	CALL!
256K X 1-70NS	CALL!
256K X 1-60 NS	CALL!
256K X 4-100NS	CALL!
256K X 4-80NS	CALL!
256K X 4-70NS	CALL!
256K X 4-60NS	CALL!
64K X 4-120NS	CALL!
64K X 4-100NS	CALL!
64K X 4-80NS	CALL!
64K X 1-150NS	CALL!
64K X 1-120NS	CALL!
64K X 1-100NS	CALL!

CACHE

8 X 8-15	5.00
32 X 8-15	16.00
8 X 8-25	4.00
32 X 8-25	7.80
64 X 4-25	5.00
16 X 4-25	5.00
8 X 8-20	4.50
32 X 8-20	8.00
64 X 4-20	10.00
16 X 4-20	5.50
16 X 4-15	9.00
64 X 1-20	18.00
64 X 1-15	20.00

MATH CO-PROCESSORS

INTEL	
8087 5MHZ INTEL	45.00
8087-2 8MHZ INTEL	129.00
8087-1 10MHZ INTEL	89.00
80287-6 6MHZ INTEL	49.00
80287-8 8MHZ INTEL	49.00
80287-10 10MHZ INTEL	59.00
80287XL 10MHZ INTEL	75.00
80287XLT 12MHZ INTEL	75.00
80387SX-16 16MHZ INTEL	75.00
80387SX-20 20MHZ INTEL	75.00
80387SX-25 25HZ INTEL	75.00
80387DX-16 16MHZ INTEL	75.00
80387DX-20 20MHZ INTEL	75.00
80387DX-25 25MHZ INTEL	75.00
80387DX-33 33MHZ INTEL	75.00
80487SX-25 INTEL	CALL
OVERDRIVE SX DX33	CALL
OVERDRIVE SX DX25	CALL
OVERDRIVE SX DX20	CALL
RAPID CAD	CALL
CYRIX	
83D87DX-16 16MHZ CYRIX	75.00
83D87DX-20 20MHZ CYRIX	75.00
83D87DX-25 25MHZ CYRIX	75.00
83D87DX-33 33MHZ CYRIX	75.00
83D87DX-40 40MHZ CYRIX	85.00
83S87SX16 16MHZ CYRIX	69.00
83S87SX20 20MHZ CYRIX	69.00
83S87SX25 25MHZ CYRIX	69.00
82S87XL CYRIX	69.00
WEITEK	
3167-20MHZ WEITEK	295.00
3167-25MHZ WEITEK	395.00
3167-33MHZ WEITEK	495.00
4167-25MHZ WEITEK	445.00
4167-33MHZ WEITEK	695.00
IIT	
2C87-5 8MHZ IIT	54.00
2C87-10 10MHZ IIT	54.00
2C87-12 12MHZ IIT	60.00
2C87-20 20MHZ IIT	64.00
3C87-16 16MHZ IIT	69.00
3C87 20 20MHZ IIT	69.00
3C87-25 25MHZ IIT	69.00
3C87-33 33MHZ IIT	69.00
3C87-40 40MHZ IIT	75.00
3S87SX-16 16MHZ IIT	69.00
3S87SX-20 20MHZ IIT	69.00
3S87SX-25 25MHZ IIT	69.00
3S87SX-33 33MHZ IIT	69.00

INTEL CPUs

386 SX	
80386 DX/20	39
80386 DX/25	74
80386 DX/33	89
AMD DZ40	99
486DX/SX	
80486 DX/25	299
80486 DX33	359
80486 DX50	499
80486 DX-2/50	479
80486 DX-2/66	599
80486 SX/25	179
80486 SX/20	149
80486 SX/33	249

MOTHER BOARDS

386DX-33-64K CACHE W/CPU	$199
386DX-33-256K CACHE W/CPU	249
386DX-40-64K CACHE W/CPU	210
386DX-40-256K CACHE W/CPU	259
486SX-25-64K CACHE W/CPU	349
486DX-33-64K CACHE W/CPU	499
486DX-33-256K CACHE W/CPU	543
486DX-50-256K CACHE W/CPU	749

PROCESSOR UPGRADES

Kingston 386 & 486

Now you can use WINDOWS in enhanced mode get true multitasking & Background operation for WINDOWS 3.1, OS/2 & other 386 specific hardware. Processor upgrades offer dramatically increased system performance by up to 350% & easy installation.

5X NOW! supports IBM AT and others into a 386

25MHZ	192
33MHZ	215

SLC NOW! supports 286 PS/2, 50,50Z & 60 into a 486

20MHZ	139
25MHZ	228
50MHZ	398

486 NOW! supports PS/2, 70, 80 & COMPAQ into 486

DX33MHZ	638
SX25MHZ	429

MicroModular supports all MCA PS/2 into a 486 (0-16MB memory)

486DX33	1255
486SX25	928

AT Master supports 386SX systems from IBM & COMPAQ (0-16MB)

486DX33	1399
486SX25	969

PS/2 HARD DRIVES

PS/2 50, 55Z, 55SX, 60, 70, 80, P70

INTERNAL DRIVE KITS - May be used as a high performance replacement or to co-exist with the original IBM drive. Compatible with DOS 3.3, 4.01, 5.0, OS/2, 2.0 and Novell. Includes IDE or SCSI-2 microchannel controller, hard drive, mounting kit, ribbon and power cable, manual, and hardware.

106MB 15MS IDE	383
125MB 15MS IDE	414
125MB 15MS SCSI	435
200MB 15MS IDE	453
200MB 15MS SCSI	513
340MB 13MS IDE	589
340MB 13MS SCSI	669
512MB 12MS IDE	1043
512MB 12MS SCSI	1294
1.2GB 12MS SCSI	1443

PS/2 MODEL 25, 30, 30-286

INTERNAL DRIVE KITS - Includes controller, drive, mounting kit, cables and hardware. Supports DOS 5.0, Windows 3.1

42MB HARD DRIVE KIT	189
106MB HARD DRIVE KIT	253
125MB HARD DRIVE KIT	284
200MB HARD DRIVE KIT	323
MICROCHANNEL CONTROLLER	
IDE	169
SCSI-2	179

IDE CONTROLLER supports all internal IDE drives. Zero slot installation for model 50 & 50Z.

SCSI-2 CONTROLLER supports 7 internal or external SCSI drives, CD Roms & Tape Backups, with 7 year warranty! Both support DOS 5.0, Windows & OS/2, compatible with existing IBM drive and controllers.

IBM

M51SX & M51SLC	
2MB MOD 07G1879	
4MB MOD 07G1880	
8MB MOD 07G1881	
L40SX, X20SX LAPTOP	
2MB MOD 79F0999	
4MB MOD 79F1000	
8MB MOD 79F1001	
P75 & P70	
2MB MOD 6450902	
4MB MOD 6450126	
PS/1 286	
512K MOD 1057035	
2MB MOD 9279935	
PS/1 386SX	
512K MOD 1057035	
2MB MOD 9279935	
4MB MOD 9279694	
PS/2 25	
128K KIT 78X8955	
PS/2 75 & 35 25S	
512K KIT 30F5348	
2MB KIT 30F5360	
0-16MB E-C N/A	
PS/2 35SX, 35LS, 40SX	
1MB MOD 6450603	
2MB MOD 6450604	
4MB MOD 8779977	
8MB MOD 6450129	
PS/2 55SX & 55LS	
1MB MOD 6450603	
2MB MOD 6450604	
4MB MOD 8779977	
0-16MB E-C	
PS/2 57SX, M57SLC, 56SX, 56SLC, 76 & 77	
2MB MOD 6450902	
4MB MOD 6450128	
8MB MOD 6450130	
PS/2 70-121, 70-121, 121, 001, 061	
1MB MOD 6450603	
2MB MOD 6450604	
0-32MB E-C	
PS/2 70-A21, -A16, -A21, -A61, 861, 821	
2MB MOD 6450608	
0-32MB E-C	
PS/2 80 A16, A21, A31	
4MB MOD 6451060	
0-32MB E-C	
MODEL 90XP & 95XP INSTALL IN PAIRS	
2MB MOD 6450902	
4MB MOD 6450128	
8MB MOD 6450130	
16 BIT EXPANSION CARD FOR MODELS 50, 60, 55SX, 65SX, 55LS MAXIMUM TWO CARDS PER MACHINE	
0-16MB E-C	
1MB MOD 6450603	
2MB MOD 6450604	
4MB MOD 8779977	
8MB MOD 6450129	
32 BIT EXPANSION CARD FOR MODELS 70 & 80 MAXIMUM TWO CARDS PER MACHINE	
0-32MB E-C	
1MB MOD 6450603	
2MB MOD 6450604	
4MB MOD 8779977	
8MB MOD 6450129	
4019 & 4019S	
3.5MB E-C 1038675	
4029	
4MB MOD 118335	
THINKPAD 360	
2MB DRD33G8238	
8MB CRD33G2369	
THINKPAD 700 700T	
8MB RC06451157	
THINKPAD 700 & 700C	
2MB MOD071419	
4MB MOD07G1420	
8MB MOD07G1421	
N45SL	
2MB MOD92F8804	
CLASSIC LAPTOP	
2MB CRD07G1418	
4MB CRD07G1420	
8MB CRD07G1421	
PS/1 CONSULTANT 2133, G11, E13, G14, ESSENTIAL W11, W13, W14, VALUEPOINT 325T & EXPERT E11, E13, E14	
1MB MOD6450603	
2MB MOD6450608	
4MB MOD6450128	
8MB MOD6450130	
PS/2 80-041	
1MB MOD6450375	
PS/2 80-081, 111, 121, 161, 311 & 321	
2MB MOD6450378	
MODEL 95-80 0MF, 0MT ECC MODULES	
4M3 MOD6451158	
8MB MOD6451159	
XSTATION 120 & 130	
1MB VRAM-4201	
1MB MOD6450603	
2MB MOD6450604	
4MB MOD34F9933	
PS/8090 POWERSTATION POWERESERVER 220	
4MB MOD6450128	
8MB MOD6450130	
RISC SYSTEM 6000	
NO BOARD INCLUDED	
16MB KIT 4030	
32MB KIT 4033	
64MB KIT 4036	
PS 2 MODEL 25, 30, 30-286	
INTERNAL DRIVE KITS - Includes controller, drive, mounting kit, cables and hardware. Supports DOS 5.0, Windows 3.1	
42MB HARD DRIVE KIT	189
106MB HARD DRIVE KIT	253
125MB HARD DRIVE KIT	284
200MB HARD DRIVE KIT	323
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SCSI-2 CONTROLLER supports 7 internal or external SCSI drives, CD Roms & Tape Backups, with 7 year warranty! Both support DOS 5.0, Windows & OS/2, compatible with existing IBM drive and controllers.

DESKPRO 386/20C, /25E	
1MB E-C 113644001	
4MB E-C 113645001	
1MB MOD 113101001	
4MB MOD 113132001	
DESKPRO 386/33	
2MB MOD 115144001	
DESKPRO 25/33L, 486/33L	
2MB MOD 115144001	
8MB MOD 116561001	
32MB MOD 116568001	
6 SOCK-EC 116569001	
DESKPRO 486/25, /50L	
2MB MOD 115144001	
8MB MOD 116561001	
32MB MOD 116568001	
DESKPRO 386/25M, 486/33M, 486/33M, /25M	
1MB MOD 116568001	
2MB MOD 116569001	
4MB MOD 116569001	
8MB MOD 128877001	
6 SOCK-EC 129160001	
DESKPRO 25SM, 33SM, 33SM/25M	
1MB MOD 116563001	
2MB MOD 116569001	
4MB MOD 116569001	
3 SOCK-EC 118700001	
PROLINEA 3/33, 3/25ZS	
2MB KIT 141738-001	
8MB KIT 141742-001	
PROLINEA 4/33, 4/66I	
1MB MOD 141682-001	
2MB MOD 141683-001	
4MB MOD 141684-001	
8MB MOD 141685-001	
SYSTEMPRO	
2MB MOD 115144001	
8MB MOD 116561001	
32MB MOD 116568001	
6 SOCK-EC 116569001	
SYSTEMPRO/LT 386-25S, 486SX-25S	
1MB MOD 116568001	
2MB MOD 116569001	
4MB MOD 116569001	
8MB MOD 128877001	
6 SOCK-EC 129160001	
CONTURA 3/25, /25	
2MB MOD 139497001	
4MB MOD 139499001	
8MB MOD 139499001	
CONTURA 4/25	
4MB MOD 146522001	
8MB MOD 146521001	
15MB MOD 146522001	
DESKPRO 90 SERIES	
SYSTEMPRO LT 486SX/25S & 33/25SX	
2-64MB BD 129180 + 689	
4-64MB BD 129180 + 690	
8-64MB BD 129180 + 877	
SYSTEMPRO/XL	
16MB KIT 136818001	
32MB KIT 136817001	
128MB KIT 139918001	
6 SOCK-EC 139938001	
PRESIONIA	
1MB MOD 116568001	
2MB MOD 116569001	
4MB MOD 116569001	
8MB MOD 128877001	
15MB MOD 139917001	
32MB MOD 149147001	
LITE 4/25C	
2MB CRD 142337002	
4MB CRD 142337003	
6MB CRD 142337004	

hp

HP VECTRA 386/33M - 33M	
2MB D2714A	
8MB D2715A	
HP VECTRA 286/12, ES12PC	
2MB KIT D1354A	
0-16MB E-C	
386/16M, /20M	
2MB KIT D2406A	
8MB KIT D2404A	
0Z/16S, 8S25PC, 20PC, 20C	
2MB KIT D1354A	
386/25PC, 486UPC	
2MB MOD D2381A	
8MB MOD D2156A	
486/25PC, 486PC, 486ZEI, 486/33T	
1MB MOD D2150A	
2MB MOD D2381A	
4MB MOD D2156A	
8MB MOD D2152A	
9000/375, /380, 345, 400DL 400S, 400T, 425S	
8MB KIT H9822B	
16MB KIT H9822B	
32MB KIT H9822B	
9000/433T	
4MB KIT H9822C	
8MB KIT H9822B	
16MB KIT H9822B	
9000/433S	
4MB KIT H9822C	
9000/425E	
4MB KIT A2200A	
8MB KIT A2201A	
16MB KIT A2202A	
9000/720, /730	
16MB KIT A1979A	
32MBN KIT A2512A	
9000/750	
16MB KIT A1979A	
32MB KIT A1987A	
9000/785, /710	
16MB KIT A2216A	
16MB KIT A2217A	
32MB KIT A2218A	
X-STATION 700RX	
1MB MOD C2320A	
2MBX MOD C2321A	
4MB MOD C2322A	
8MB MOD C2152A	
DESKJET 500C, 500 PLUS, 550C	
256KB MOD H2270/B	
LASERJET II, IID	
2-4 E-C H3344B	
4MB E-C H3344B	
LASERJET IIP, III, IIID, IIIP	
2-4MB E-C H3347B	
3-4MB E-C H3347B	
4MB E-C H3347B	
LASERJET IIISI	
4MB MOD C2055A	
8MB MOD N/A	
HP-4 -4M, -4SI, -4SIMX, -XL3D9	
1MB C2063A	
2MB C2064A	
4MB C2065A	
8MB C2066A	
HP LASERJET FAX	
1MB	
PAINTJET XL300	
OK EXP BD	
HP DESKJET 600 INKJET	
4MB C2065A	
8MB C2066A	

TOSHIBA

T1000SE	
1MB C-C PCPA8311U	
2MB C-C PCPA8312U	
T1900L	
1MB C-C PCPA8311U	
2MB C-C PCPA8312U	
4MB C-C PCPA2001U	
8MB C-C PCPA2002U	
T1000CE	
1MB C-C PCPA8311U	
2MB C-C PCPA8312U	
T2000	
1MB C-C PC1BPA8316U	
2MB C-C PC1BPA8317U	
4MB C-C PC1XPA8314U	
8MB C-C PC1XPA8315U	
T2000SX	
4MB C-C PC14PA8314U	
8MB C-C PC14PA8315U	
T2000SXE, T2200SX, T1600, T1550, T1850C	
2MB C-C PCPA2000U	
4MB C-C PCPA2001U	
8MB C-C PCPA2002U	
T3000SL	
2MB C-C PCPA2006U	
4MB C-C PCPA2007U	
6MB C-C PCPA2008U	
8MB C-C PCPA2009U	
16MB C-C PCPA2010U	
T4400SX, T4400SXC, T5400-C	
2MB C-C PCPA2003U	
4MB C-C PCPA2004U	
8MB C-C PCPA2005U	
16MB C-C PCPA2010U	
32MB C-C N/A	
T1200XE	
2MB MOD PC13PA8306U	
T1900	
2MB MOD PC3PA7135E	
T3100	
2MB KIT PC9PA8341U	
T3100SX	
1MB MOD PC15PA8308U	
4MBMODPC15PA8310U	
T3200	
3MB MOD PC6PA7137U	
T3200SX	
2MB KIT PC12PA8307U	
4MB KIT PC12PA8309U	
T3200SXC	
2MB KIT PC19PA8318U	
4MB KIT PC19PA8319U	
T5100, T5100C	
2MB MOD PC7PA8301U	
T5200, T5200C, T3500	
2MB KIT PC8PA8304U	
8MB KIT PC8PA8313U	
T4500, T4500C	
4MB C-C PCPA16U	
8MB C-C PCPA2017U	
16MB C-C N/A	
PAGELASER II	
2-4MB E-C N50090	
4MB E-C N80100	

Apple

POWERBOOK 100, 140, 145, 170	
2MB MOD M1032LL-A	
4MB MOD M1033LL-A	
8MB MOD N/A	
POWERBOOK 150, 180	
2MB MOD N/A	
4MB MOD N/A	
8MB MOD N/A	
8MN MOD N/A	
10MB MOD N/A	
POWERBOOK 210, 230	
NOTE: THERE ARE THREE TYPES OF MODULES FOR MODELS 210 & 230, "UPGRADABLE", "BASE" AND "CONVENTIONAL". BE SURE TO PURCHASE THE CORRECT ONE FOR YOUR NEEDS.	
CONVENTIONAL (STANDARD)	
2MB MOD N/A	
4MB MOD N/A	
6MB MOD N/A	
8MB MOD N/A	
10MB MOD N/A	
12MB MOD N/A	
BASE - WILL ACCEPT 1 UPGRADE MODULE	
4MB MOD N/A	
8MB MOD N/A	
12MB MOD N/A	
20MB MOD N/A	
UPGRADE MODULES - INSTALL ON THE BASE MODULES	
4MB MOD N/A	
8MB MOD N/A	
16MB MOD N/A	
MAC PORTABLE	
2MB MOD N/A	
4MB MOD N/A	
8MB MOD N/A	
MAC PORTABLE BACKLIT	
2MB MOD N/A	
3MB MOD N/A	
8MB MOD N/A	
EGS	
1-4MB E-C N/A	
MAC PLUS	
2MB KIT M0219	
4MB KIT M0207	
MAC CLASSIC	
1-2MB E-C M6361LL-A	
2MB KIT M0219	
MAC CLASSIC II, LC, LCII	
2MB KIT M0219	
4MB KIT N/A	
8MB KIT N/A	
MAC SE	
2MB KIT M0219	
4MB KIT M0207	
MAC SE/30	
4MB KIT M0207	
16MB KIT N/A	
MAC II	
4MB KIT M0207	
MAC IIX	
4MB KIT M0207	
16MB KIT N/A	
MAC LC	
2MB KIT M0219	
4MB KIT M0207	
MAC SE/30	
4MB KIT M0207	
16MB KIT N/A	
MAC II	
4MB KIT M0207	
MAC IIX	
4MB KIT M0207	
16MB KIT N/A	
MAC LC	
2MB KIT M0219	
4MB KIT N/A	
8MB KIT N/A	
512K VRAM	
MAC P33, IICI	
2MB MOD M0514LL-A	
4MB KIT M0207	
16MB KIT N/A	
32MB KIT N/A	
64MB KIT N/A	
MAC IIFX	
4MB KIT M0376LL-A	
16MB KIT N/A	
64MB KIT N/A	
MAC IICX	
4MB KIT M0207	
16MB KIT N/A	
32MB KIT N/A	
64MB KIT N/A	
MAC QUADRA 700, 900, 950	
4MB KIT H0270/7	
16MB KIT N/A	
32MB KIT N/A	
64MB KIT N/A	
QUADRA VIDEO 700,900	
512K KIT M5951LLA	
QUADRA VIDEO 950	
512K KIT M5951LA	
PERSONAL LASER WRITER LS	
512K KIT 33H0314	
PERSONAL LASER WRITER NT	
2MB KIT M0219	
8MB KIT N/A	
LASERWRITER (NTX, INTXJ)	
1MB KIT M6005	
4MB KIT M6006	
LASERWRITER IIF/IIG	
4MB KIT M0207	
16MB KIT N/A	
LASER WRITER IINTX	
2MB	
MAC IIVX	
4MB KIT M0282LLA	
16MB KIT N/A	
32MB KIT N/A	
64MB KIT N/A	
CENTRIS 610, 650, LC III	
4MB 1507LLA	
8MB MA	
16MB 6150BLLA	
32MB MA	
POWERBOOK 165C	
4MB NA	
8MB NA	
16MB NA	
LASERWRITER SELECT 310	
1MB M0300JA	
4MB M2005GA	

TRAVELMATE 4000LC/25	
2MB 256679060001	
TRAVELMATE 2300	
1MB 255803401	
TRAVELMATE 3000	
TRAVELMATE 3000WINSX	
2MB KIT 256677001	
TRAVELMATE 4000WINSX	
4MB MOD 258126300001	
MICROLASER PLUS, XL	
MICROLASER PLUS TURBO	
1MB MOD 255739001	
2MB KIT N/A	
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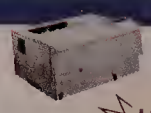

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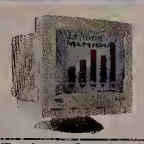

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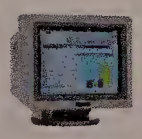

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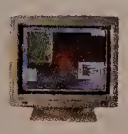

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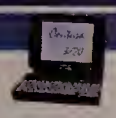

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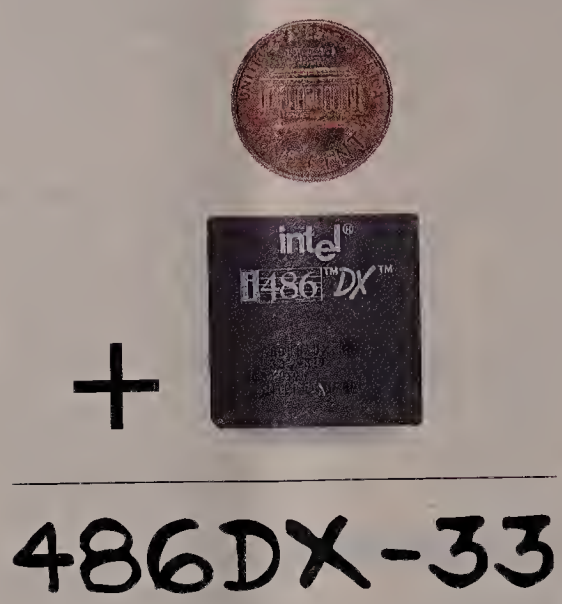

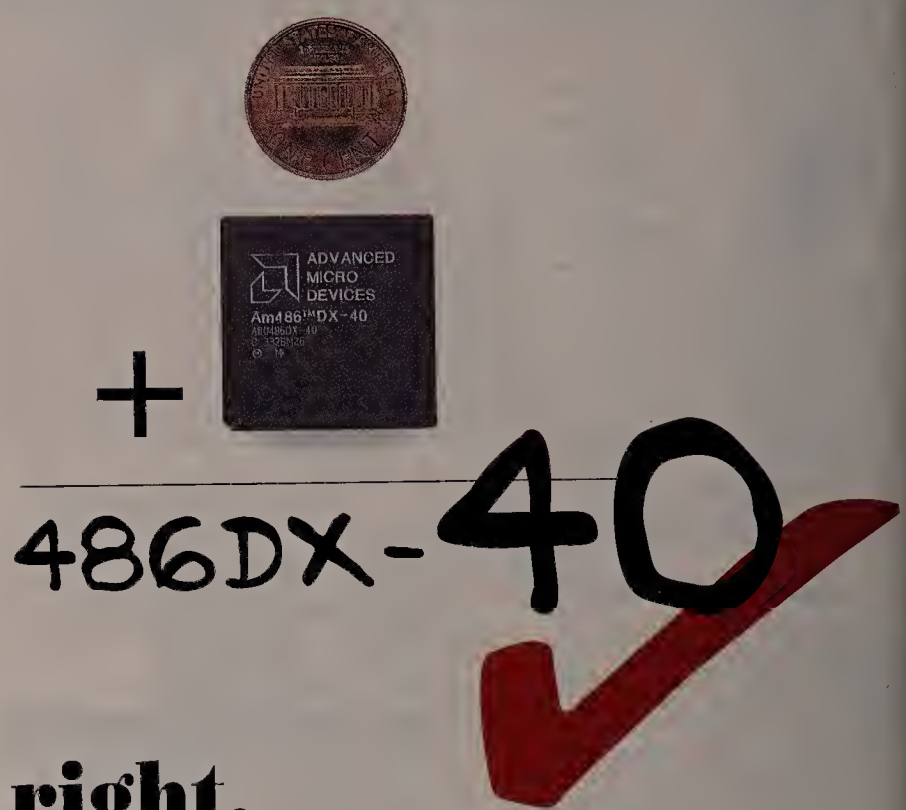

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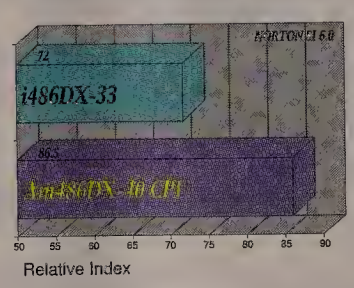

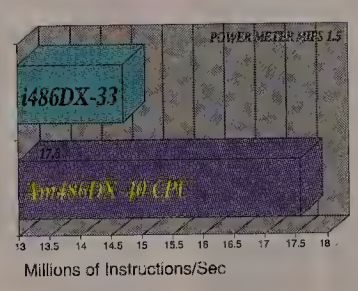

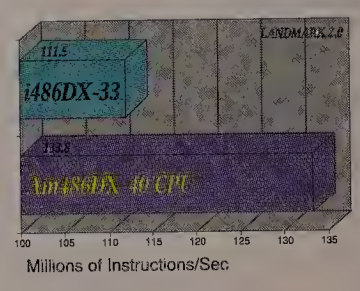

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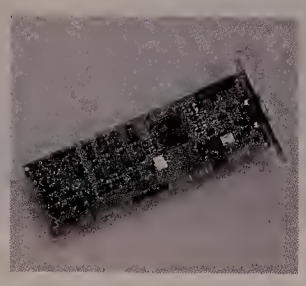

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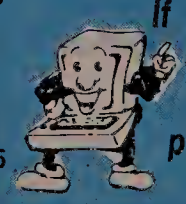

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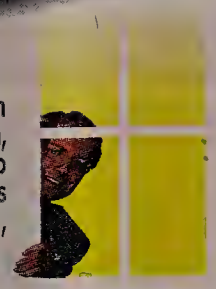

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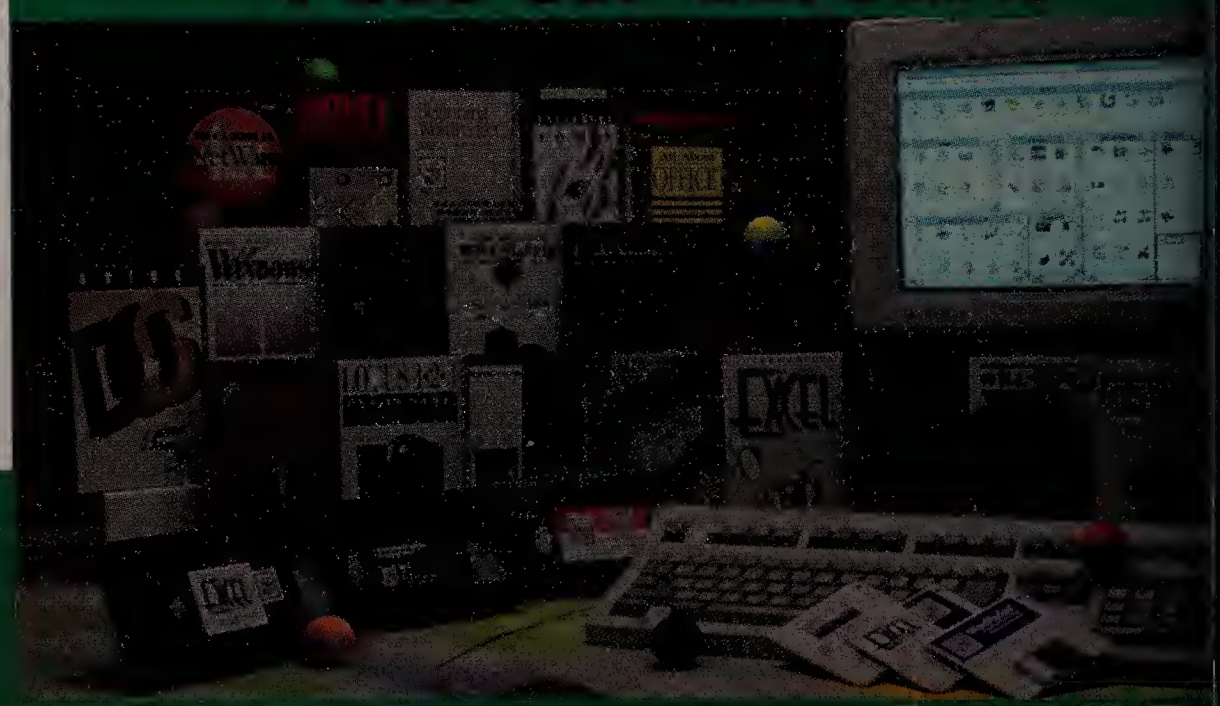

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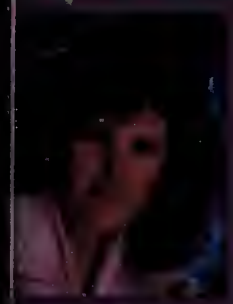

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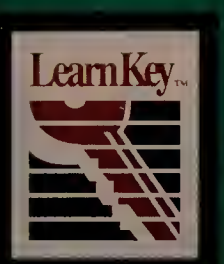

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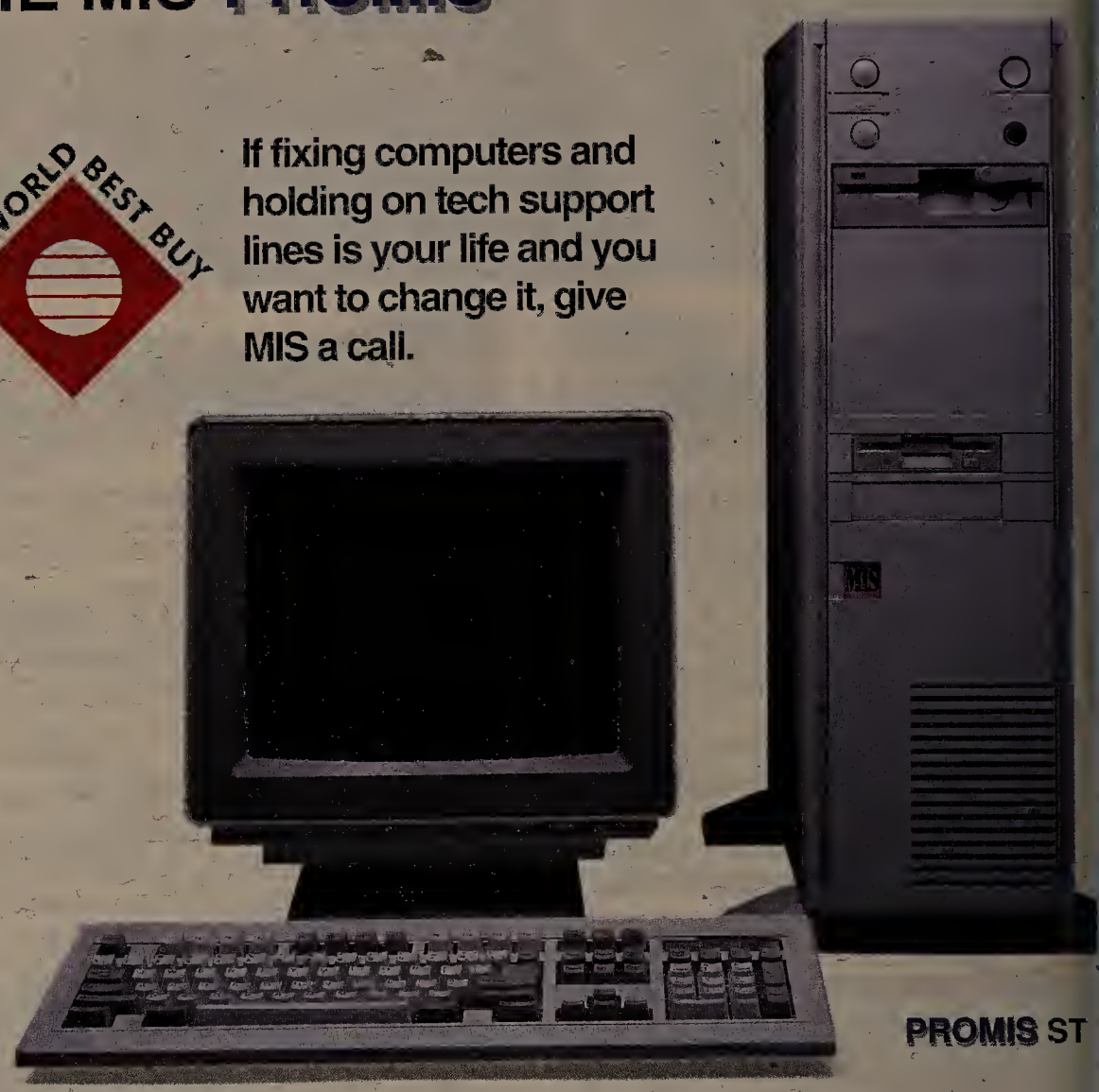

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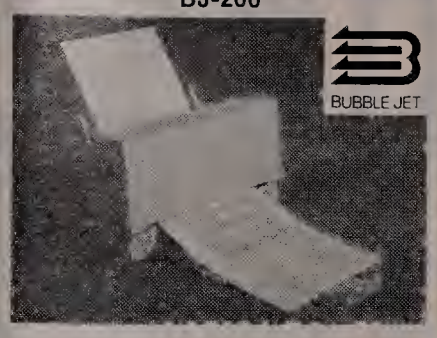

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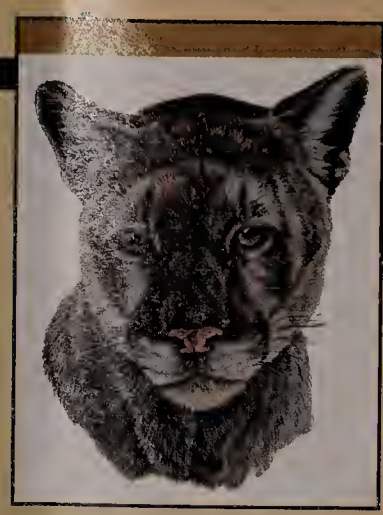

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- Shows customer balance during invoicing.
- Allows recurring invoices.
- Price level lookup during invoicing.
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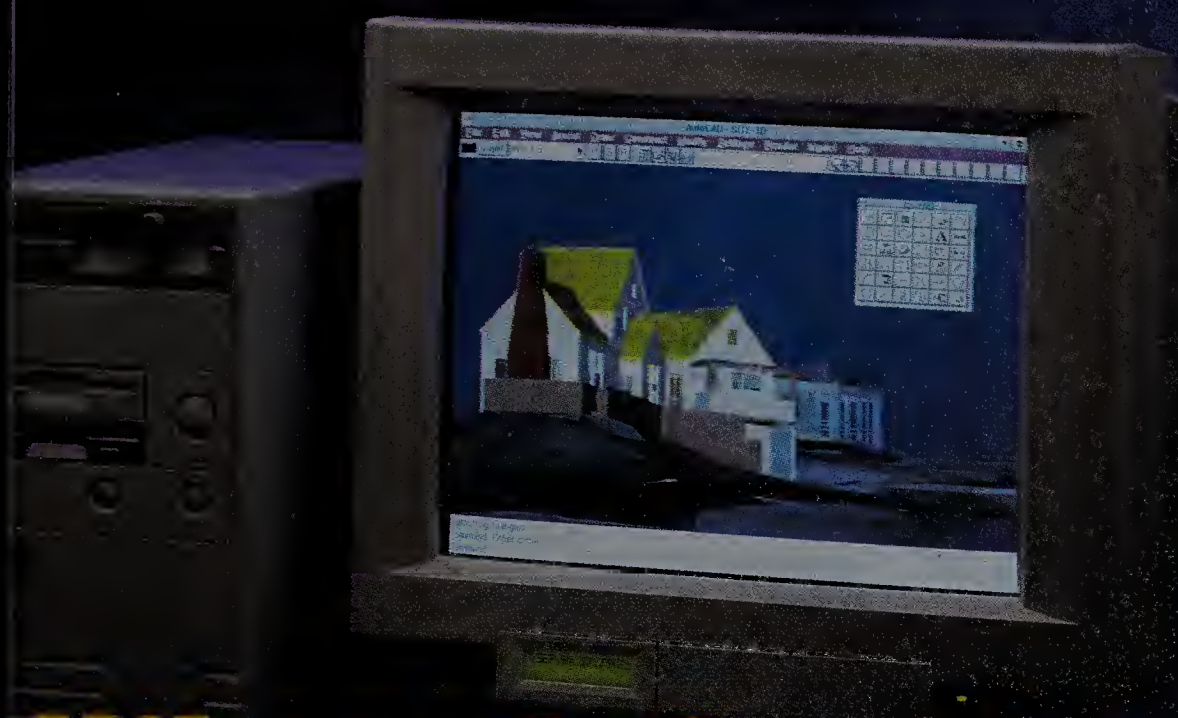

Where It Counts!

DOS Mark (Overall Performance)

Source: Review-Com[illegible] July & August 1993

Comtrade	100
Dell	86
Insight	82
Gateway	81
Tri-Star	71

WINDOWS Speed Index

Source: Review-BYTE Magazine, June 1993

Comtrade	8.7
AST	2.7
DEC	4.5
Dell	5.4
Gateway	5.1

Graphics Winmarks 3.11

Source: Review-Windows Sources, June 1993

Comtrade	43.3
Dell	21.8
ExpoTech	11.8
Gateway	14.3
Insight	16.7

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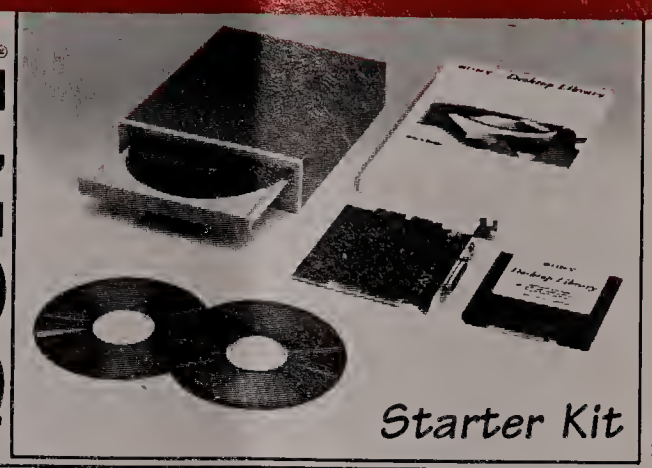

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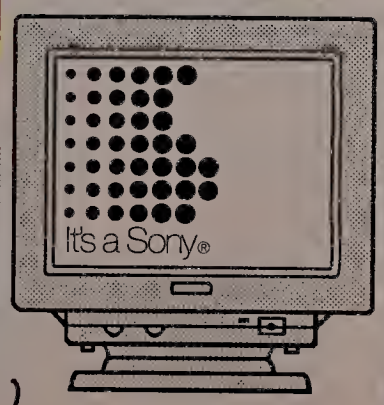

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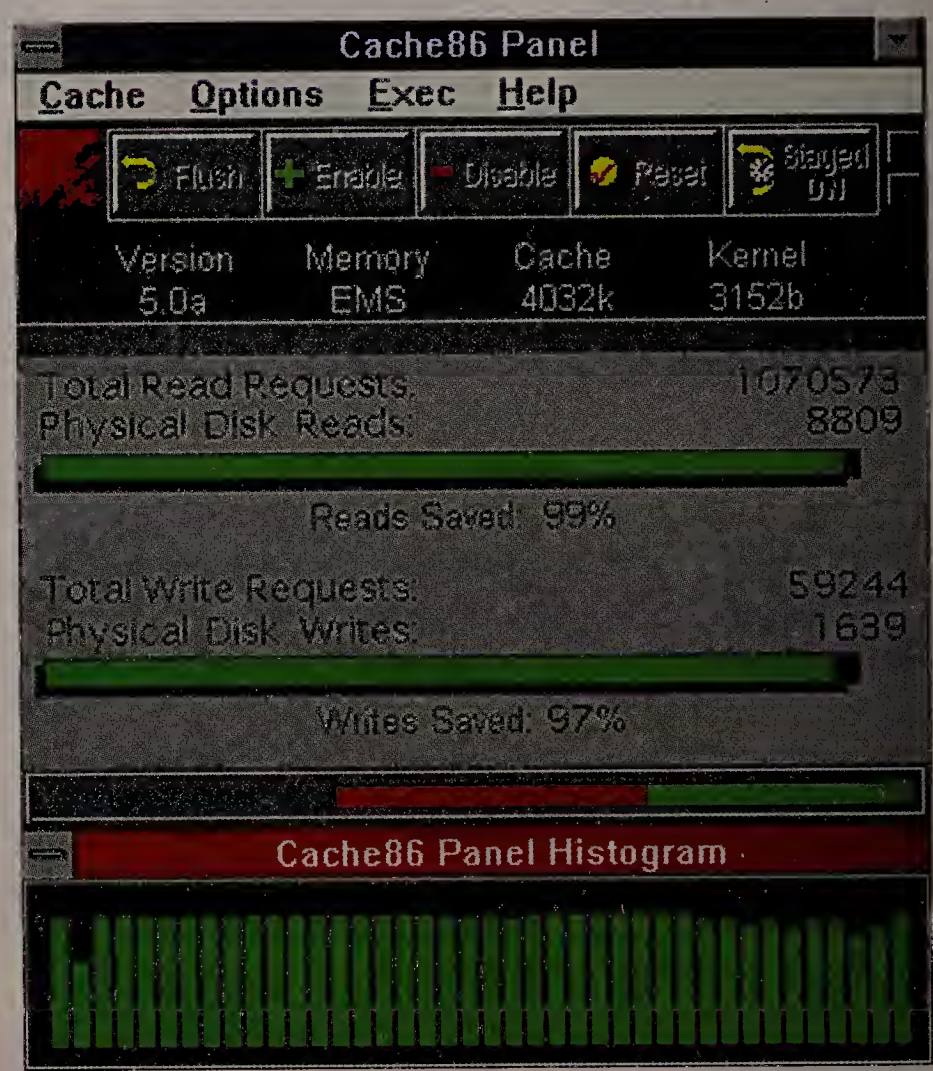

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
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221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
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601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
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741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
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861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

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952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
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421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
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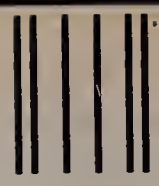

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
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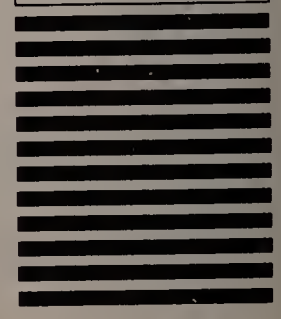

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Advertiser Index A-Z

Get more information—circle the appropriate number on the reader service card.

Reader Service Number		Page Number
66	Acma Computers	165
–	ACT!	123
9	Advanced Logic Research	18-19
195	Aldridge	416H
31	All Micro	375A
44	Altima Systems, Inc.	350-351
123	Ambra	110-113
127	Ambra	242-245
155	America On Line	385
45	American Power Conversion	356
–	Anthro Corp.	46
27	Arabesque Software	149
8	Arlington Computer Corp.	415
102	Artisoft	375B
–	AST Research	24-25
5	ATI Technologies	319
32	Austin Computer Systems	32
20	Austin Computer Systems	352-353
2	Ball Computers	148
95	Bay Technical Association	363
16	Borland International	29
6	Buick Motor Division	317A
215	Caere Corp.	30-31
–	Canon Computer Systems	150-151
50	Canon Computer Systems	369B
52	Central Point Software	271
103	Charles Schwab & Co.	141
–	Chipsoft, Inc.	359
113	Citizen America Corp.	185
18	Coactive Computing	181
196	Colorado Memory Systems	278
88	Compaq Computer Corp.	206-207
61	Compaq Computer Corp.	260-262
35	Compaq Computer Corp.	374-375
83	Compaq Computer Corp.	90-91, 93
19	CompUSA	336-337
33	Compuserve, Inc.	183
51	Computer Associates	22
26	Computer Associates	44
42	Computer Associates	325
68	Computer Discount Warehouse	409-411
65	Comtrade	416D-416E
93	Corel Systems	145
56	Cougar Mountain Software	416C
54	Creative Labs	269
7	Creative Labs	142-143
–	Curtis Manufacturing	121
92	Cyrix Corp.	250-251
94	Daceasy	355
62	Datastorm Technology	276
–	Dell Computer Corp.	11-15
–	Dell Computer Corp.	C4-C7
171	Delrina Technology	47
76	Deneba Software	163
125	Diskette Connection	416F-416G

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Index

Reader Service Number		Page Number
–	Edmark	140
–	Epson America	86-87
101	Ergodyne	34-35
82	Executrain Corp.	358
235	Fifth Generation Systems	16
153	Fujitsu	315B
–	Gateway 2000	52-77
79	Haventree Software	147
90	Helix Software	205
–	Hewlett Packard	20-21
–	IBM Corp.	115
–	IBM Corp.	277
–	IBM Corp.	217-220
–	IBM Corp.	224-225
–	IBM Corp.	256-257
–	IDG Books	386-387
120	Imagination Network	416A
–	Impulse	315A
116	Inmac	189-192
131	Insight Direct	416B
115	Intel	377
109	Intel Corp.	152-153
137	Interlink Corp	273
–	Intuit	335
–	Intuit	274-275
138	Kao Corp.	331
138	Kao Corp.	333
156	Keystone	369A
118	Kinesis Corp.	362
–	LA Trade	398
206	Learnkey, Inc.	412-413
122	Logitech	27
241	Logitech	381
–	Lotus	101-104
–	Lotus Development	95
126	Lyco Computers	408
147	M-USA	144
141	M-USA	379
129	MapInfo	38-39
161	Maplinx	203
–	Meca Software	321
166	Media Age	404-407
22	Media Magic	249
145	Media Vision	227
167	Media Vision	399
197	MEI Micro Center	36-37
217	Merritt Computer Products	371
157	Micro Express	137
157	Micro Express	139
128	Micrografx	107
–	Microsoft	372
–	Microsoft	373
–	Microsoft	125-132
200	Microsolutions	26
172	MIS Computer Systems	414
143	Moustrak	378
–	Multimedia World	425
168	Multiple Zones, Inc.	259
194	Nanao USA Corp.	160-161
–	NCR	327-330
205	NEC	109
–	NEC	339-346
201	NEC	C2-1
177	New Vision Technology	97
227	Norton Lambert	187
222	One-Write Plus	167
–	Open University	92
233	Patton & Patton Software	28
181	PC America	401
–	PC Connection	364-367
207	PCW On-Line	332
211	Phoenix Ltd.	361
212	PK Ware	380
158	Powersoft, Inc.	317B
149	Prodea Software Corporation	315
184	QMS Inc.	9
189	Quarterdeck Office Systems	172-173
239	Rose Electronics	40
255	Sampo Corp of America	213
225	Serif	117
221	Seritech Enterprise	372
191	Sigma Designs	8
–	Software Publishing	48-50
112	Stereo PC	146
249	Supra Corp.	357
124	Tektronics	119
220	Texas Instruments	201
–	Texas Instruments	400
220	Texas Instruments	195-199
242	Texas Instruments	229-238
228	Toshiba America	322-323
243	Traveling Software	369
148	USA Flex	403
192	Velocity Entertainment	10
218	ViewSonic	175
–	WordPerfect Corp.	214-215
–	WordPerfect Corp.	266-267
–	WordPerfect Corp.	41-43
238	Worldwide Technologies	402
219	Zeos International	4-5
251	Zeos International	6-7
259	Zone Publishing	371

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Advertiser Index by Product Category

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HARDWARE

Boards/Chips/Cards

Reader Service Number		Page Number
5	ATI Technologies	319
92	Cyrix Corp.	250-251

Communications

Reader Service Number		Page Number
115	Intel	377
172	MIS Computer Systems	414
249	Supra Corp.	357

Computers

Reader Service Number		Page Number
66	Acma Computers	165
9	Advanced Logic Research	18-19
123	Ambra	110-113
127	Ambra	242-245
–	AST Research	24-25
20	Austin Computer Systems	352-353
61	Compaq Computer Corp.	260-262
35	Compaq Computer Corp.	374-375
83	Compaq Computer Corp.	90-91, 93
19	CompUSA	336-337
65	Comtrade	416D-416E
–	Dell Computer Corp.	11-15
–	Dell Computer Corp.	C4-C7
68	Gateway 2000	52-77
–	IBM Corp.	115
–	IBM Corp.	217-220
116	Inmac	189-192
166	Media Age	404-407
157	Micro Express	137
157	Micro Express	139
–	NCR	327-330
112	Stereo PC	146
148	USA Flex	403
219	Zeos International	4-5

Desktop Publishing

Reader Service Number		Page Number
194	Nanao USA Corp.	160-161

Input Devices

Reader Service Number		Page Number
–	Hewlett Packard	20-21
118	Kinesis Corp.	362
122	Logitech	27
241	Logitech	381
143	Moustrak	378

Laptop/Notebook

Reader Service Number		Page Number
44	Altima Systems, Inc.	350-351
32	Austin Computer Systems	32
88	Compaq Computer Corp.	206-207
19	CompUSA	336-337
68	Gateway 2000	52-77
–	IBM Corp.	224-225
197	MEI Micro Center	36-37
221	Seritech Enterprise	372
242	Texas Instruments	229-238
228	Toshiba America	322-323
251	Zeos International	6-7

Local Area Networks

Reader Service Number		Page Number
95	Bay Technical Association	363
18	Coactive Computing	181

Monitor/Display

Reader Service Number		Page Number
194	Nanao USA Corp.	160-161
–	NEC	339-346
255	Sampo Corp of America	213
218	ViewSonic	175

Multimedia

Reader Service Number		Page Number
54	Creative Labs	269
7	Creative Labs	142-143
–	IBM Corp.	277
–	IBM Corp.	256-257
22	Media Magic	249
145	Media Vision	227
167	Media Vision	399
201	NEC	C2-1
225	Serif	117
191	Sigma Designs	8
112	Stereo PC	146

Peripheral/Sharing Devices

Reader Service Number		Page Number
95	Bay Technical Association	363
196	Colorado Memory Systems	278
109	Intel Corp.	152-153
115	Intel	377
239	Rose Electronics	40

Printers/Plotters

Reader Service Number		Page Number
45	American Power Conversion	356
–	Canon Computer Systems	150-151
50	Canon Computer Systems	369B
113	Citizen America Corp.	185
–	Epson America	86-87
205	NEC	109
184	QMS Inc.	9
124	Tektronics	119
220	Texas Instruments	201
–	Texas Instruments	400
220	Texas Instruments	195-199

Scanners/Digitisers

Reader Service Number		Page Number
153	Fujitsu	315B

Other

Reader Service Number		Page Number
–	Curtis Manufacturing	121
196	Colorado Memory Systems	278
200	Microsolutions	26

Systems

Reader Service Number		Page Number
–	AST Research	24-25
131	Insight Direct	416B
–	Microsoft	372
–	Microsoft	373

SOFTWARE

Accounting/Financial

Reader Service Number		Page Number
94	Daceasy	355
103	Charles Schwab & Co.	141
–	Chipsoft, Inc.	359
56	Cougar Mountain Software	416C
–	Intuit	335
–	Intuit	274-275
147	M-USA	144
141	M-USA	379
168	Multiple Zones, Inc.	259
222	One-Write Plus	167
42	Computer Associates	325

Index

Reader Service Number — Page Number

Communications
62 Datastorm Technology 276
227 Norton Lambert 187
243 Traveling Software 369

Database Management
– ACT! 123
215 Caere Corp. 30-31
26 Computer Associates 44
– Lotus Development 95
161 Maplinx 203
158 Powersoft, Inc. 317B

Education
– Edmark 140
– Open University 92

Electronic Mail
– WordPerfect Corp. 266-267

Entertainment
120 Imagination Network 416A
192 Velocity Entertainment 10
259 Zone Publishing 371

Graphics
93 Corel Systems 145
76 Deneba Software 163
– WordPerfect Corp. 214-215

Integrated Software
– Microsoft 125-132

Management
27 Arabesque Software 149
90 Helix Software 205
181 PC America 401

Multimedia
22 Media Magic 249

Project Management
51 Computer Associates 22
128 Micrografx 107
233 Patton & Patton Software 28
– WordPerfect Corp. 214-215

Presentaion Graphics
177 New Vision Technology 97
– Software Publishing 48-50

Schedule Software
27 Arabesque Software 149
– WordPerfect Corp. 266-267

Spreadsheets/Templates/Forms
16 Borland International 29
– Lotus 101-104

Taxware
– Chipsoft, Inc. 359
– Meca Software 321

Utilities
52 Central Point Software 271
235 Fifth Generation Systems 16
212 PK Ware 380
189 Quarterdeck Office Systems 172-173

Windows
16 Borland International 29
62 Datastorm Technology 276
76 Deneba Software 163
161 Maplinx 203
128 Micrografx 107
227 Norton Lambert 187
149 Prodea Software Corporation 315
– Software Publishing 48-50
– WordPerfect Corp. 41-43

Word Processing/Aids
211 Phoenix Ltd. 361
– WordPerfect Corp. 41-43

Other
171 Delrina Technology 47
79 Haventree Software 147
138 Kao Corp. 331
138 Kao Corp. 333
129 MapInfo 38-39

MISCELLANEOUS

Computer Accessories
– Anthro Corp. 46
101 Ergodyne 34-35
– Impulse 315A
217 Memitt Computer Products 371
143 Moustrak 378

Mail Order
195 Aldridge 416H
31 All Micro 375A
8 Arlington Computer Corp. 415
102 Artisoft 375B
2 Ball Computers 148
68 Computer Discount Warehouse 409-411
125 Diskette Connection 416F-416G
– LA Trade 398
126 Lyco Computers 408
172 MIS Computer Systems 414
148 USA Flex 403
238 Worldwide Technologies 402

On-Line Services
155 America On Line 385
6 Buick Motor Division 317A
33 Compuserve, Inc. 183
120 Imagination Network 416A
207 PCW On-Line 332

Other
– Multimedia World 425
– PC Connection 364-367

Periodicals
– IDG Books 386-387

Training
31 All Micro 375A
82 Executrain Corp. 358
137 Interlink Corp 273
156 Keystone 369A
206 Learnkey, Inc 412-413

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

Accounting
632 Kiplinger's CA-Simply Money 1.0, Computer Associates 159
– QuickBooks 2.0 for Windows, QuickBooks 2.0 for DOS; Intuit 134
– Quicken, Quicken for Windows; Intuit 174

Add-On Board
758 Graphics Ultra Pro, ATI Technologies 174
786 SoundBlaster Pro, Creative Labs 174

Backup Software
643 Central Point Backup for DOS 8.0, Central Point Backup for Windows 2.0; Central Point Software 316
750 Central Point Backup, Central Point Software 174
642 Norton Backup 2.2 for DOS, Norton Backup 2.2 for Windows; Symantec 316

Business Application
707 Corporate Vision 1.0, IntelligenceWare 116

CAD/CAM
746 AutoCAD, Autodesk 174

CD ROM Software
610 1993 Time Compact Almanac, Compact Publishing 241
618 The Animals, The Software Toolworks 247
620 Berlitz Think and Talk, HyperGlot Software 248
616 Books in Print with Book Reviews Plus, Reed Reference Electronic Publishing 247
616 Books Out of Print Plus, Reed Reference Electronic Publishing 247
614 Business Locator, Dun & Bradstreet Information Services 246
615 Dialog OnDisc US Business Reporter, Dialog Information Services 246
606 Global Explorer, DeLorme Mapping 240
616 Ingram-Books in Print Plus, Reed Reference Electronic Publishing 247
616 Ingram-Books in Print with Book Reviews Plus, Reed Reference Electronic Publishing 247
622 Living Books, Broderbund 248
609 Microsoft Bookshelf 1993 Edition, Microsoft 241
768 Microsoft Bookshelf, Microsoft 174
619 Microsoft Cinemania, Microsoft 247
607 Microsoft Encarta, Microsoft 240
621 Microsoft Musical Instruments, Microsoft 248
614 Middle Market Disc, Dun & Bradstreet Information Services 246
614 Million Dollar Disc, Dun & Bradstreet Information Services 246
613 Moody's Company Data, Moody's Investors Service 246
613 Moody's International Company Data, Moody's Investors Service 246
611 MS-DOS Collection, New Frontiers 241
611 MS-Windows Collection, New Frontiers 241
612 PhoneDisc, Digital Directory Assistance 241
612 PhoneDisc Reverse, Digital Directory Assistance 241
612 PhoneDisc USA Business, Digital Directory Assistance 241
612 PhoneDisc USA Residential, Digital Directory Assistance 241
614 Service Market, Dun & Bradstreet Information Services 246
627 Sherlock Holmes Consulting Detective, Icom Simulations 241
606 Street Atlas USA, DeLorme Mapping 240
608 Toolworks Reference Library, The Software Toolworks 240
617 Where in the World Is Carmen Sandiego? Deluxe Edition, Broderbund 247

Communications
688 Message Port, Nuko Information Systems 140
783 Procomm Plus for Windows, Datastorm Technologies 174
808 QmodemPro 1.51, QmodemPro for Windows; Mustang Software 136
789 WinFax Pro, Delrina 174

Computer System
715 Acer Acros 486DX2/66, Acer America 180
716 Ambra D466BL, Ambra Computer 182
717 AST Bravo LC 4/66d Model 213W, AST Research 182
824 AST Premmia LX, AST Research 83
737 Atronics ATI 486DX/33 Multi VL, Atronics Int'l 204
699 Austin Computer 486 DX2-66, Austin Computer 105
718 Axik Ace Cache 486DX2-66V, Axik Computer 182
719 Blackship BLK 486DX/33 LB, Blackship Computer Systems 184
738 Compaq Presario 425, Compaq Computer 204
822 Compaq ProLiant File Server, Compaq Computer 80
823 Compaq XE, Presario, ProLinea; Compaq Computer 81
720 CompuAdd C433S Low Profile, CompuAdd Computer 184
721 Comtrade EISA VLB 486DX2/66, Comtrade 186
702 DEC LP Value Line, Digital Equipment 106
825 DECpc XL Series, Digital Equipment 83
722 Diamond DT 486C-40 VL, Diamond Technologies 186
739 DTK Grafika-4V2D-S2, DTK Computer 208
723 Eltech Splendor III, Eltech Research 186
724 Everex Step VL EISA DX2/66, Everex Systems 188
740 Gateway 4DX-33, Gateway 2000 208
755 Gateway 4DX2-66V, Gateway 2000 174
756 Gateway HandBook, Gateway 2000 174
757 Gateway Nomad 450DXL, Gateway 2000 174
741 Hewlett-Packard Vectra 486/33VL Model 240, Hewlett-Packard 208
– IBM ThinkPad 700C, IBM 174
– IBM's PS/2 E, IBM 157
725 Insight 486DX2-66 VL, Insight 188
726 Logisys L-Windows 486DX/33, Logisys 193
727 Micro Express MicroFlex-VL/S, Micro Express 193
728 MicroSource Tempest 486VLB-66, MicroSource 194
729 MIS Promis SL-66, MIS Computer Systems 194
730 National MicroComputers 486 VL-Bus Winstation, National MicroComputers 194
731 NCR 3230 Local Bus, NCR 200
732 NEC PowerMate 466, NEC Technologies 200
733 Netis N433VL, Netis Technology 202
629 NoteJet 486, Canon Computer Systems 159
742 Packard Bell PB 486SX/33, Packard Bell Electronics 208
734 Polywell Poly 4586VR, Polywell Computers 202
816 Portege T3400, T3400CT; Toshiba America Information Systems 96
628 Presario, Compaq Computer 157
735 Quill Qtech VL-4334, Quill 202
817 T4700CS, T4700CT; Toshiba America Information Systems 96
743 Tandy 3100, Tandy 208
736 Tangent M440VL, Tangent Computer 204
700 Texas Instruments TravelMate 4000E 486 WinSX/25MHz, Texas Instruments 105
686 Tri-CAD, Tri-Star Computer 140
697 Universa Notebooks, Aspen Computers 144

Index

Reader Service Number — Page Number

631 Zoomer, Casio 164

Database Management

767 Microsoft Access, Microsoft 174

Desktop Publishing

779 PageMaker, Aldus 174

Development Tool

748 Borland C++, Borland Int'l 174

Disk Drive

747 Bernoulli Transportable MultiDisk 150, Iomega 174
788 Western Digital Caviar, Western Digital 174

Display

703 Brilliance 1520AS, Philips Consumer Electronics 108
703 Brilliance 1720DC, Philips Consumer Electronics 108
703 Brilliance 2120DC, Philips Consumer Electronics 108
773 MultiSpin 84, NEC Technologies 174
774 MultiSync 4FG, NEC Technologies 174

E-Mail

749 cc:Mail, Lotus Development 174
711 E-Mail Connection, Connect Software 135
712 MailPlus, Computer Mail Services 135

Entertainment/Game

796 Betrayal at Krondor, Sierra Online/Dynamix 423
797 Bicycle Poker for Windows, SWFTE Int'l 423
626 Chessmaster 3000 Multimedia Pro, The Software Toolworks 241
625 Day of the Tentacle, LucasArts Entertainment 241
623 Loom, LucasArts Entertainment 241
795 Pirates Gold, MicroProse 423
624 The Secret of Monkey Island, LucasArts Entertainment 241
790 Wolfenstein 3-D, Apogee Software Productions 174

Fax-Modem

807 DeskPorte Fast, TravelPorte Fast; Microcom 136
713 Intel PCMCIA Faxmodems, Intel 138
765 Intel SatisFaxtion, Intel 174

Financial

745 Adobe Type Manager for Windows, Adobe Systems 174
689 Market Monitor, Dow Jones & Company 148

Form Generation

753 FormTool Gold, Bloc Publishing 174

Graphics

754 Freelance Graphics for Windows, Lotus Development 174
636 Intellidraw 2.0, Shapeware 164
805 SnapGrafx 1.0, Micrografx 133
636 Visio 2.0, Shapeware 164

Image Editing

744 Adobe Photoshop, Adobe Systems 174
706 Adobe Premiere 1.0, Adobe Systems 114
705 MediaMerge 1.0, ATI Technologies 114
637 PainterX2, Fractal Design 166
692 PaperBridge for Access, TeamWorks 146

Input Device

820 ergoLogic 7.1, ErgoLogic Enterprises 100
820 FlexPro, Key Tronic 100
821 MyKey, Ergonomixx 100

LAN Operating System

775 Netware 3.12, Novell 174

Mailing List Program

602 Address Express, CoStar 426
602 LabelWriter II, CoStar 426

Mail Order

716 Ambra D466BL, Ambra Computer 182
737 Atronics ATI 486DX/33 Multi VL, Atronics Int'l 204
718 Axik Ace Cache 486DX2-66V, Axik Computer 182
719 Blackship BLK 486DX/33 LB, Blackship Computer Systems 184
720 CompuAdd C433S Low Profile, CompuAdd Computer 184
721 Comtrade EISA VLB 486DX2/66, Comtrade 186
722 Diamond DT 486C-40 VL, Diamond Technologies 186
723 Eltech Splendor III, Eltech Research 186
740 Gateway 4DX-33, Gateway 2000 208
726 Logisys L-Windows 486DX/33, Logisys 193
727 Micro Express MicroFlex-VL/S, Micro Express 193
728 MicroSource Tempest 486VLB-66, MicroSource 194
729 MIS Promis SL-66, MIS Computer Systems 194
730 National MicroComputers 486 VL-Bus Winstation, National MicroComputers 194
731 NCR 3230 Local Bus, NCR 200
732 NEC PowerMate 466, NEC Technologies 200
733 Netis N433VL, Netis Technology 202
734 Polywell Poly 4586VR, Polywell Computers 202
735 Quill Qtech VL-4334, Quill 202
743 Tandy 3100, Tandy 208
736 Tangent M440VL, Tangent Computer 204

Miscellaneous

764 Intel Pentium, Intel 174
693 PictureTel Live PCS 100, PictureTel 146

Multimedia Software

634 Compel, Asymetrix 164
691 Microsoft's Sound System, Cylogic Software 144
709 MultiMedia Works, MultiMedia Works Developer's Toolkit; Lenel Systems 118

Online Service

751 CompuServe, CompuServe 174

Operating System/ Environment

772 Microsoft Windows 3.1, Microsoft 174
815 MS-DOS 6.2, Microsoft 94

Personal Information Manager

633 Ecco, Arabesque Software 157
793 Ecco Simplicity, Arabesque Software 120
778 Organizer, Lotus Development 174

Presentation Graphics

752 CorelDraw 4.0, Corel 174
818 Micrografx Charisma 4.0, Micrografx 98

Printer

759 HP DeskJet 500, Hewlett-Packard 174
760 HP DeskJet 550C, Hewlett-Packard 174
761 HP LaserJet 4, Hewlett-Packard 174
704 Lexmark IBM 4037 5E Page Printer, Lexmark Int'l 108
780 Panasonic KX-P1124i, Panasonic Communications & Systems 174
687 Spectra StarGT, Spectra Star Q10E; General Parametrics 140

Printer Utility

806 ClickBook, BookMaker 124
809 ZScript, Zenographics 124

Project Management

771 Microsoft Project for Windows, Microsoft 174

Scanner

701 ScanJet IIcx, Hewlett-Packard 106
785 ScanMan 256, Logitech 174

Scanning Software

777 OmniPage Pro, Caere 174

Spreadsheet

814 Excel 5.0, Microsoft 84
763 Improv, Lotus Development 174
769 Microsoft Excel, Microsoft 174

Spreadsheet Utility

605 CompressMate, Intext Solutions 331

Tape Backup

766 Jumbo 250, Colorado Memory Systems 174

Tax

787 TurboTax for Windows, ChipSoft 174

User Group

603 Winnipeg PC User Group, Hart Macklin 317

Utility

710 Aldridge Cache86 5.0 for Windows and DOS, The Aldridge Company 118
646 Animated Desktop for Windows, DeltaPoint 255
644 AnyView 1.0, Binar Graphics 254
649 ArtScreens 1.5.1, Trident Software 255
652 A Touch of Chaos, Bourbaki 258
– BailOut (freeware), Dick Bryant 264
638 CD Speedway, Bloc Publishing 316
714 Chameleon NFS, NetManage 138
661 ClickBook 1.0, BookMaker 268
666 Clip'nSave 2.0, Dynalink Technologies 270
– CmdLine (shareware) 264
667 Collage Complete 1.0, Inner Media 270
648 Cursorific Professional 3.0, AApex Software 255
674 Dashboard for Windows 2.0, Hewlett-Packard 264
653 DOS for Windows 2.0, Landmark Research Int'l 263
792 Eclipse Find, Phoenix Technologies 120
654 EDOS 3.70e, Firefly Software Systems 263
675 Fantastic Recall, Binar Graphics 264
– FLiP (shareware), Aubum Software 268
676 FolderBolt 1.01, Kent Marsh 264
658 Golden Retriever 2.0, Above Software 265
668 HiJaak Pro 2.0, Inset Systems 270
– Hunter (shareware), Peter Eddy 264
647 Icon Do-It,Hear-It, Make-It; Moon Valley Software 255
690 Image Alchemy PS, Handmade Software 146
669 ImagePals 1.2, Ulead Systems 272
639 Lightning for Windows 1.2, Lucid 316
651 Microsoft Scenes, Microsoft 258
650 More After Dark, Berkeley Systems 258
645 More Windows 3.0, AristoSoft 255
798 Norton Desktop for Windows 3.0, Symantec 134
640 Norton SpeedCache Plus 4.0, Symantec 316
776 Norton Utilities, Symantec 174
819 PC Tools Pro 9.0 for DOS, Central Point Software 99
663 Pizazz Plus, Application Techniques 268
782 PKZip, PKWare 174
664 PrintCache 3.1, LaserTools 270
694 PrintCache PC 3.1, LaserTools 140
804 QuickFind, View Software 133
604 Restart Windows 1.0 (freeware), Cecilia Wong 347
695 Screenies, Screenies 148
660 Searcher Professional for Windows 2.0, Cognitronix 268
– SmartSearch 1.1 (shareware), Terminal Velocity 265
641 Super PC-Kwik 5.1, PC-Kwik 316
665 SuperPrint 3.0, Zenographics 270
696 Sure Maps 2.0, Horizons Technology 146
803 Toolbox for Windows, PC-Kwik 122
656 Transom 1.4, Metro Software 263
– Trash-Can File Delete (freeware) 265
670 UnInstaller 1.11, MicroHelp 272
691 Voice User for Windows, Cylogic Software 144
– WinBatch 4.0 (shareware), Wilson WindowWare 265
– WinBatch Compiler, Wilson WindowWare 265
655 WinCLI Pro, Eschalon Development 263
671 Windows Resource Kit, Microsoft 255
600 WinGrab 2.0, ZPay Payroll Systems 426
601 WinLabel 1.1, Peloton Computer Enterprises 426
– WinPost (shareware), Eastern Mountain Software 265
– WinSock (freeware), Chris Hewitt 265
– WinTrail (shareware), Rooftop Software 265
– WMEM.EXE (freeware), Charles K. Snider 264
– ZipShell 2.50 (shareware), NewVision Software 265
665 ZScript with SuperPrint 3.0, Zenographics 270
665 ZScript, Zenographics 270

Word Processing

791 WordPerfect, WordPerfect 174
708 XyWrite for Windows, The Technology Group 116

Word Processing Utility

802 Dyno Notepad, Portfolio Software 122

Swashbuckling Pirates Play to a Full House of Sorcerers

There aren't many superstar game designers, but Pirates creator Sid Meier is one. For many years, fans of this swashbuckling classic—one of the best early computer games—have waited patiently for a VGA update. The wait is finally over. Pirates Gold is just as exciting as its illustrious predecessor: And on top of that, the graphics are better, and the action is faster.

Basic play is unchanged: You sail your pirate vessel around the Caribbean, sword fighting with hostile captains and dastardly pirates, quelling mutinous buccaneers, battling enemy ships, stealing their cargo, and selling it for a profit at various ports. You also get to plunder towns, perform special missions for the governor, sweet-talk the governor's daughter, track down long-lost relatives, and search for buried treasure. The sense of actually sailing the Spanish main is tremendous—especially since Pirates Gold lets you choose from among four nationalities and six historically accurate time periods. This game is really a crash course in the political history and geography of the Caribbean—only school was never this much fun.

As with the original game, if you prefer to skip the long process of establishing your fortune and reputation, you can jump into the middle of a Famous Expedition. Here you start the game with a fleet of ships and a large crew of happy buccaneers, and you must achieve a predetermined goal to win, such as ambushing the Treasure Fleet on its way home from Peru.

Pirates Gold offers several big improvements over its predecessor: A turbo mode speeds the action during those long, boring tacks into the wind; encounters with enemy vessels are more frequent; an on-screen map shows you where you are as well as the locations of the different cities; and the islands are rendered a lot more accurately—Trinidad, for instance, actually looks like Trinidad.

Still, in some ways the game reveals its age: The sound effects and animation that you encounter during the sword fighting and sea battles are still a bit primitive, and a lot of the graphics are still drawings. But even so your imagination will have no trouble bringing this rollicking adventure to life. Climb aboard, matey!

You get to choose your weapon and style of swordplay in Pirates Gold. The symbols at the bottom of the screen show your personal ferocity and how many of your scurvy sea dogs are fighting alongside you.

Kill Your Opponents and Steal Their Stuff

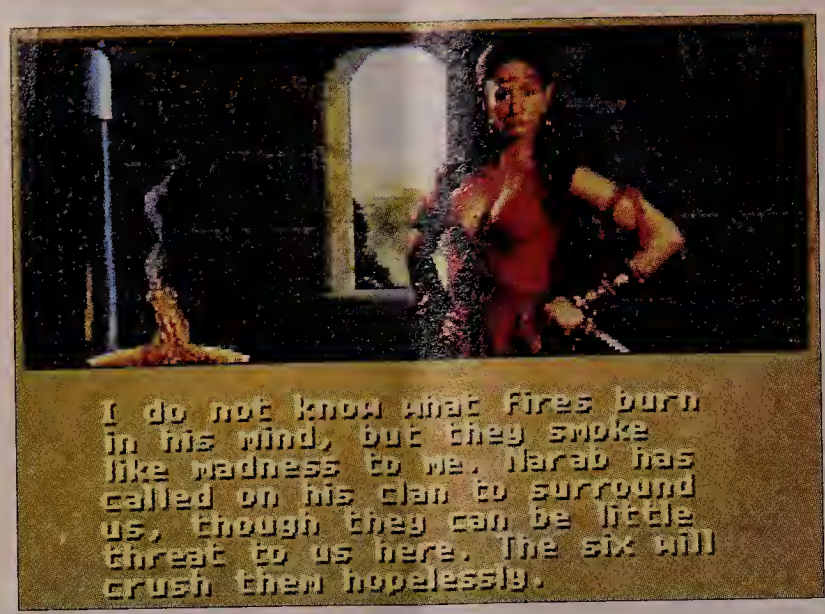
Betrayal at Krondor, a fantasy role-playing adventure based on Raymond Feist's best-selling *Riftwar* novels, requires every spare byte in your PC's memory. But for once, you won't have to delve into the depths of your DOS manual to create esoteric CONFIGs and AUTOEXECs; just click the appropriate installation menu choice, and the game will create a boot disk for you. This is such a great idea, I can't believe that more games don't use it. Kudos to Dynamix.

Once the game is up and running, its literary origin is pretty obvious. While some sequences unfold via simple, rotoscoped live-action scenes, and battles are shown in crude cartoon animation, most of the story is presented through still illustrations accompanied by paragraph after paragraph of text. You'd better enjoy reading, because that's how you'll spend most of your time on Krondor. The good news is that the writing is several cuts above the bilge that passes for text in most fantasy games; the bad news is that the graphics are a bit fuzzy and hard to make out.

The basic adventure centers around three comrades wandering through a wooded landscape of towns, temples, and generally dangerous opponents. You move from place to place by clicking on a rosette, and, depending on your taste, you can go cross-country or follow the roads. The world is seen from your characters' point of view—and it's big fun to roll through woods and over mountains, seeking adventure. Battles are frequent along the way, but they're fairly boring, and there's very little you can do to enliven them. After you kill your enemies, you can steal their stuff—the usual collection of food, magic spells, torches, and weaponry. An on-screen map helps you regain your bearings if you get lost.

On your journey down the glory road, you'll have the opportunity to drop into Temples, where the priests may heal your wounds or bless your weaponry—if you've got the gold to pay for their services. The Temples also provide access to a teleportation system, but you can't teleport to a given Temple until

By Michael Goodwin



YOU'LL FIND YOURSELF READING PLENTY OF TEXT when you enter into the fantasy role-playing world of Betrayal at Krondor, an adventure based on the Riftwar novels.

you've first visited it on foot and memorized its mystical symbol. Inns provide food and drink as well as a safe place to sleep.

In the end, Betrayal at Krondor is a fairly conventional swords-and-sorcery fantasy-adventure, set apart by above-average writing and below-average graphics. If you're a fan of Feist's books, you'll probably find this adventure particularly amusing. But for the rest of us, it's not a must-buy item.

Not a Smart Bet

Despite the box-side hype, which claims that SWFTE's Bicycle Poker is "an excellent tutor designed to teach and test all aspects of your game," this PC version of the old army game is no such thing. While you do get to choose from draw, stud, baseball, and variations that include wild cards and high-low, play proceeds without the slightest hint of advice on strategy or betting. The only way you'll realize you're playing badly is by staring at your shrinking pile of chips. Nor do you get any of the charming poker chat that enlivens other versions of PC poker.

Using the interface is easy: You bet, trade cards, and make other playing decisions by using your mouse to point and click on a series of menus. While the slow animated movement of chips and cards across the table can be tedious, at least playing is simple. But compared with Microsoft's amazing Dr. Black Jack, which combines an exciting game with a great play-by-play tutorial, the lack of a teaching component is a major drawback here—especially given the misleading hype on the box. Save your ante.

- **Betrayal at Krondor** $69.95; Sierra Online/Dynamix; 800/326-6654, 209/683-4468
  Reader service no. 796
- **Bicycle Poker for Windows** $49.95; SWFTE Int'l; 800/237-9383, 302/234-1740
  Reader service no. 797
- **Pirates Gold** $69.95; MicroProse; 800/879-7529, 410/771-1151
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Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 10 for contact information).* ■

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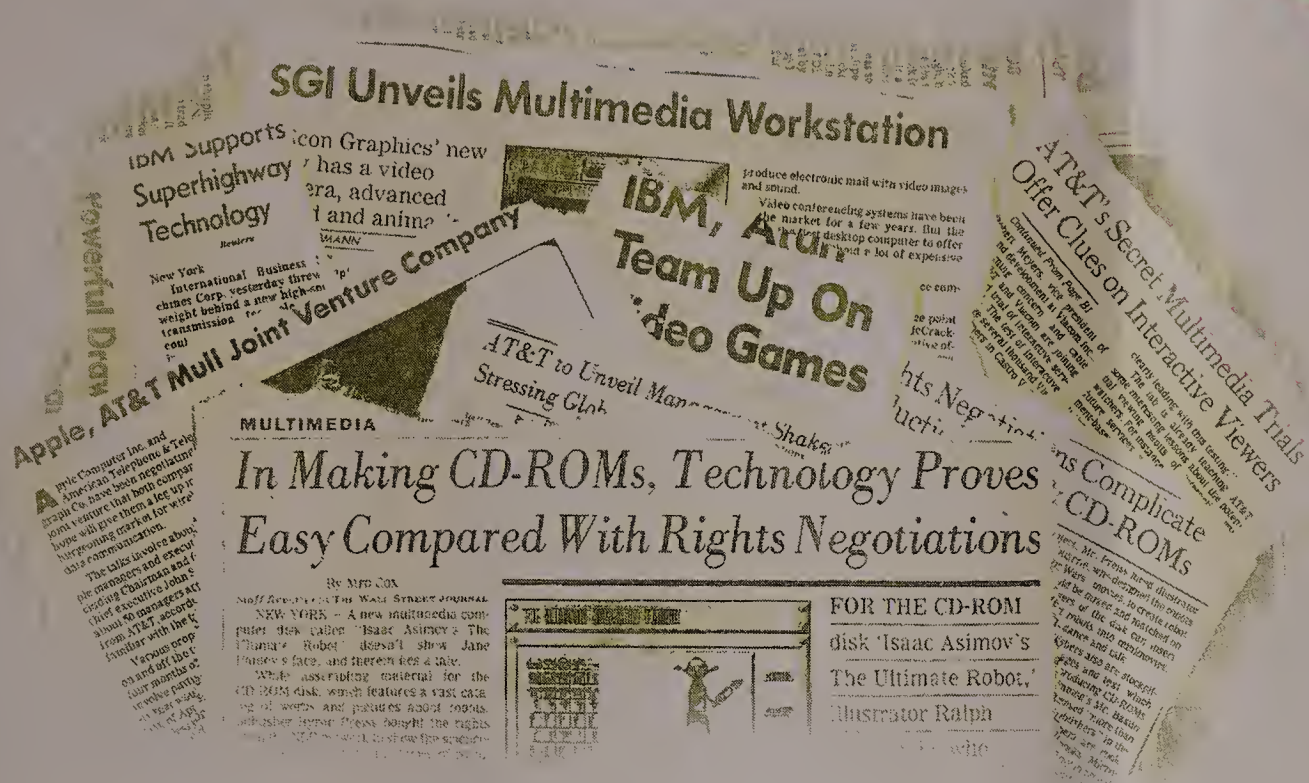

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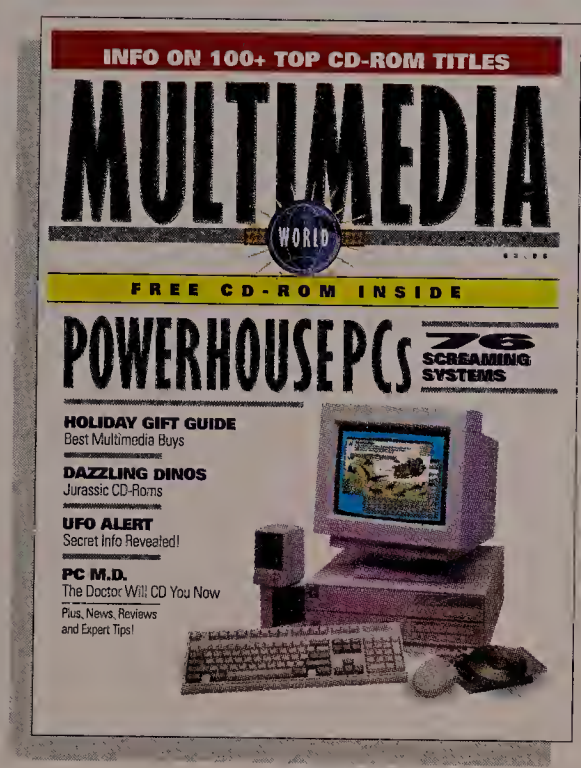

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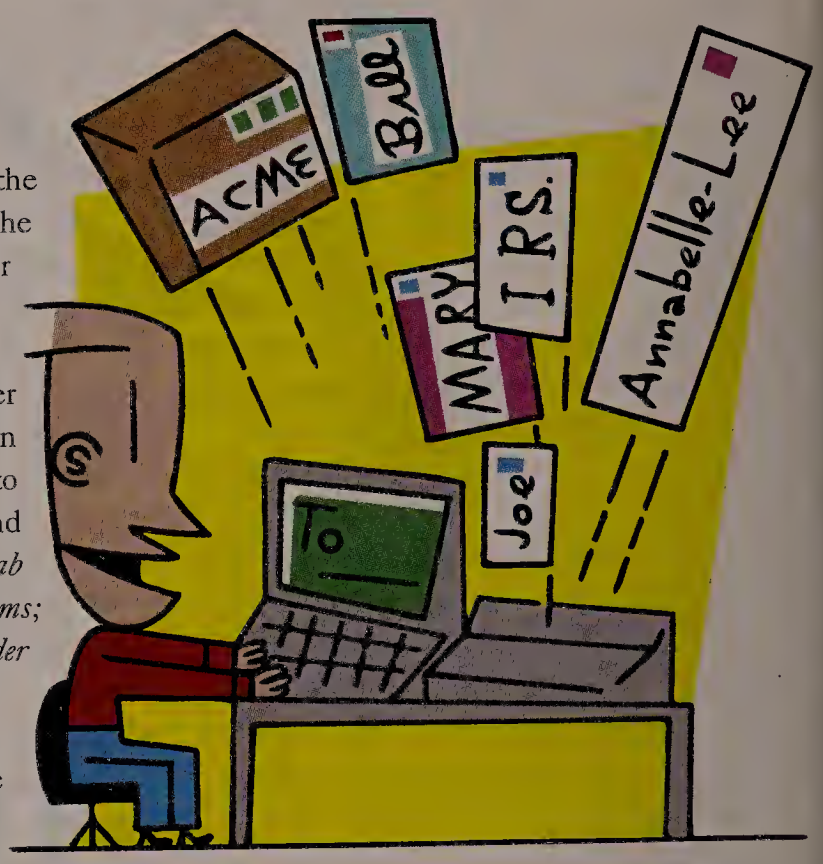
Spiffy Envelopes and Cool Labels



I like to think I run a high-tech business. I can bill clients with a few keystrokes, auto-dial phone numbers, and fax a letter with more than 42 fonts in the first paragraph. But until recently, when it came to printing envelopes—let alone labels—I was still in the Stone Age. It was so bad that I even considered (perish the thought) addressing labels by hand.

My word processor of choice—Ami Pro—is great for small mail jobs like formatting envelopes with on-screen addresses and printing them with a single command. But for sophisticated chores, it was like pulling teeth. For instance, sorting addresses on a combination of fields was tough, and adding postal bar codes proved nearly impossible. Even when Ami Pro was friendly, my LaserJet III made things difficult. Without the optional envelope tray, I could print only three envelopes before I had to refill the printer. Even at this snail's pace, the LaserJet ruined 20 percent of the envelopes that went through it.

The First Rule of Computing

One of my office rules is to always use the right tool for the job, and I've found some great programs for printing envelopes and labels. One of the best is ZPay's WinGrab, which I use for all my addressing chores. This $39.95 shareware program is jam-packed with so many delicious features, you'll register it right away. WinGrab not only grabs an address on screen and prints an envelope, it adds the correct U.S. Postal Service postnet bar codes using ZIP+4 and ZIP+6 (bar codes speed your mail delivery). It even formats the labels to meet the post office's requirements.

WinGrab handles most of my labeling needs, including printing to six of the most popular Avery label formats. For large mailings, WinGrab comes with a built-in database that imports ASCII and dBASE files. With a click of the mouse, I can pop an address from the database into my word processor and, if I'm so inclined, use the dialer to call that person. WinGrab bypasses Print Manager for faster printing and quick switches between printers. It even makes it easy to print labels on a dot matrix and envelopes on a laser. • *WinGrab 2.0 $39.95; ZPay Payroll Systems; 800/468-4188, 813/866-8233. Reader service no. 600*

But what if you need oddball labels—round ones, tags for file folders, or name tags? WinGrab can't handle these, but WinLabel, a $39.95 shareware program by Peloton, can. It comes with more than 46 Avery label sheet formats and lets you design your own. The program easily merges ASCII files and, by the time you read this, should accept dBASE and Paradox formats. You can design your own labels with an assortment of drawing tools. WinLabel also includes more than 50 clip art files. You can try both WinGrab and WinLabel for the price of a download, and even if you decide to keep and register both, you'll still spend less than if you bought Avery's $129.95 LabelPro for Windows. These shareware programs are available as WINGRB20.ZIP and WLAB10.ZIP on PC World Online. • *WinLabel 1.1 $39.95; Peloton Computer Enterprises; 403/263-2915, 403/263-2916 (fax). Reader service no. 601*

Hardware Relief

If you want the ultimate solution, there are some excellent printers designed especially for envelopes and labels. For envelopes, I like CoStar's Address Express. It holds up to 100 blank envelopes (or postcards, cut-sheet labels, or self-mailers) and prints them from scratch, including graphics, bar codes, and a return address. It uses an ink jet printhead for decent-looking output, and it's fast—up to 5 envelopes per minute if you don't use a lot of graphics. In addition, Address Express lets you create dozens of envelope designs and print them on blank envelopes.

Avery sheet labels are fine for big jobs, but what if you need to print just one or two labels a day? Using a sheet label for one name is a waste, and once you've removed one label from a sheet, you risk gumming up your laser printer if you use that sheet again. So when I need single labels, I use CoStar's spiffy LabelWriter II. For a street price of around $189, it spits out one label at a time in about two seconds. It never needs a ribbon or toner change because it uses a thermal head. Both CoStar products use the same software, available for DOS or Windows (though the Windows version is by far the easier and more powerful of the two). Now it's easy to maintain a high-tech profile even when I'm sending information via the U.S. Postal Service. • *Address Express $499, LabelWriter II $249.95; CoStar; 800/426-7827, 203/661-9700. Reader service no. 602*

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 10 for contact information).

By Steve Bass

J.D. KING

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